

ROBERT TEMPLE



# THE SIRIUS MYSTERY

New Scientific Evidence for Alien Contact  
5,000 years ago





## THE SIRIUS MYSTERY

*Robert Temple*

'Robert Temple must by now qualify for honorary membership of *The X-Files* Team. . . His evidence comes from research, and pretty convincing it is, too.' *Glasgow Sunday Post*

'This is a fascinating book because the nugget of mystery that the author has mined and polished is from a pure vein . . . The book should be taken seriously' *Nature*

'The mind boggles . . . Robert Temple is cautious. He has intellectual integrity . . . (his) massive research into the ancient mythologies of numerous civilisations and cultures one can only regard with awe' *Sunday Times*

'Robert Temple is honest with readers, careful with his sources, and writes with zest' *Daily Telegraph*

'A gripping investigation . . . a fascinating book that should be of interest to any budding ufologist' *Alien Encounters*

'Alternatively racy and densely academic . . . highly persuasive' *Newcastle Journal*

'Temple produces a dizzying patchwork of evidence . . . (he) argues with some sophistication . . . (he presents) a swirl of genuine astronomical mysteries' *Time* magazine (USA)

'Before dismissing Mr Temple's theme as fantasy or science fiction one should read his well-documented book and examine his case without prejudice' *Oxford Mail*

'An enormously entertaining, instructive and fascinating book . . . and surely even the coolest sceptic will experience an ominous shiver' *The Irish Press*

'Temple writes very nicely, backed up by copious scientific and historical research. And he worries the FBI, which must be a good thing.' *Guardian*

'A new contender in the fertile field of speculation about beings from outer-space visiting earth has pinpointed the whole cosmic mystery . . . the evidence is massive and convincing' *London Evening News*

'If the study of Earth's possible contact with extraterrestrial life is to be regarded seriously, it will take the work of people like Robert Temple' *Time Out*

'The data he has amassed is amazing . . . the implications are shattering' *Tatler*

'Robert Temple's book is scholarly and deeply-researched . . . it is rewarding study for the enquiring and open-minded' *Eastern Daily Press*

'Do you believe that civilisation began with the help of visiting aliens? And that these visitors will one day return to see how we're progressing? . . . I didn't until I sat down and

talked it all through with the drily humorous and decidedly non-cranky Robert Temple . . . not even the harshest sceptic could deny that Temple's latest contribution to the somewhat maligned literary genre of popular science is at least a digestible and entertaining read, even as it grapples with advanced maths and delves into astronomy and the ruins of ancient history with a quite dazzling display of scholarship. . . . Futurology has surely never sounded so respectable or persuasive.' *Independent on Sunday*

'Robert Temple presents a brilliant and convincing case for the existence of a highly-advanced, possibly amphibious civilisation based in the Sirius system' *Astrology Magazine* (USA)

'A provocative book backed by an enormous amount of careful research. The central idea should be followed up carefully' Professor John Taylor, Department of Mathematics, Kings College, University of London

'I would say of the book that it is the most exciting and scholarly exposition of the theory of extraterrestrial intervention that has been yet written. The Author's thesis develops logically from his impressive summary of evidence of the existence in antiquity of a code of astronomical science, which could not have been acquired by means of instruments of observation available at the time and appears to have been inherited from a prehistoric scientific tradition whose origins are profoundly mysterious' John Michell, author

'Let me express my admiration for the range of learning and investigations displayed . . . (Robert Temple) has searched widely and deeply and the results are fascinating. The special interest of Egyptians and others in Sirius is well known and Robert Temple has made a strong case for supposing that the

Dogon interest in Sirius is connected with this. In Temple's very clever investigations of Egyptian, Sumerian and Greek myths, he seems to have shown that some of these people *may* have had ideas about a dark, dense star possibly associated with Sirius . . . Robert Temple's investigations are fascinating, and they make an exciting book' Professor William H. McCrea, Professor Emeritus of Astronomy, University of Sussex

'... he does tell of very extraordinary strange things – so strange that our entire world view could be shaken if the data be correct' Dr Peter Nilsson, astronomer, Uppsala University

Robert Temple is the author of nine books which have been translated into 43 languages. He was associated with the late Joseph Needham of Cambridge University in the field of the history of Chinese science and wrote the official popularisation of Needham's research, *The Genius of China* (original title: *China: Land of Discovery and Invention*). Its Chinese edition was translated by a team of 34 specialists under the auspices of the Chinese Academy of Sciences and has been recommended to the nation's schoolchildren.

Temple's verse translation of the *Epic of Gilgamesh, He Who Saw Everything*, published in 1991, was performed at the Royal National Theatre in 1993.

Temple is a Fellow of the Royal Astronomical Society and member of many scholarly societies including the Society for the Promotion of Hellenic Studies, the Egyptian Exploration Society, the Royal Historical Society, the Institute of Classical Studies and the Institute of Historical Research. He has a degree in Sanskrit and Oriental Studies. In 1996 his abridgement of Sir James Frazer's work appeared as *The Illustrated Golden Bough*. In early 1998 he and his wife Olivia published as a Penguin Classic the first ever English translation of *The Complete Fables of Aesop*. Temple has published several scholarly articles about the zoological works of Aristotle including an outline reconstruction from fragments of Aristotle's last major work, *Dissections*.

Temple's book *Conversations with Eternity* was a survey of ancient divination techniques, including Greek oracle centres, Babylonian extispicy (divination by entrails), Shang Dynasty oracle bones in China, and the archaic proto-science linking the cracking patterns with the mathematics of the Chinese *I Ching*.

TO MY WIFE OLIVIA

there is no greater mystery than the daily awe and wonder  
of being together, and of trying to understand the  
magnificence of her

# The Sirius Mystery

New Scientific Evidence of  
Alien Contact 5,000 Years Ago



Robert Temple



ARROW

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My literary agent Bill Hamilton of A. M. Heath is humorous, enthusiastic, capable, helpful, stimulating. Does he have any faults? Probably not.

My wife Olivia has been closely involved in every stage of the preparation of the new edition, and her advice is always the final word on turns of phrase.

I wish to thank Miss Jenny Zhu for her marvellous help assisting me in the British Library in gathering further material.

Roderick Brown, with his eye for detail and acute insight, has been a superb editor for the new edition and has made several excellent suggestions for improvements. Readers can thank him for being able to see what a pale fox and a dugong look like.

Liz Rowlinson of Century has done an excellent job of editing and organizing the vast quantities of material for this book.

The staff of the British Library – long-suffering because of

my mountains of huge volumes and endless difficulties of finding books during the move to a new building, deserve thanks for their help and patience

I wish to thank all of the people who have written to me over the years with interesting information, and I regret that I have not been able to deal with very much of it. But it is all appreciated, and I still hope to continue to consider it, as this will always be an ongoing subject

I also wish to thank Robert Bauval for introducing me to B.I. Hamilton and together with Jay Weidner persuading me to renew my interest in this subject, which had been in suspended animation for many years.

I also wish to thank the Dogon Tribe, on behalf of us all, for making this investigation possible in the first place

## Author's Note

Summaries follow each chapter in Part Two. The sheer amount of the material dealt with makes it advisable for the reader to put it into a smooth perspective by reading over these summaries which have been prepared so that the reader may refresh his memory if he wishes. The author can offer no apology for the complexity of the material, but he can present these slight aids for its comprehension.

Every effort has been made to trace the ownership of all illustrative material reproduced in this book. Should any error or omission in acknowledgement have been made the author offers his apologies and will make the necessary correction in future editions.



# Contents

	page
<i>Acknowledgements</i>	ix
<i>Author's Note</i>	xi
1 The Sirius Mystery Today	3
What is the Mystery?	61
PART ONE	
<i>The Sirius Question is posed</i>	
2 The Knowledge of the Dogon	79
PART TWO	
<i>The Sirius Question is rephrased</i>	
3 A Fairytale	121
4 The Sacred Fifty	168

5 The Hounds of Hell	203
6 The Oracle Centres	239
7 Origins of the Dogon	321
8 The Rising of 'Serpent's Tooth'	359

### PART THREE

#### *Beyond the Mystery*

9 A Fable	409
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## APPENDICES

I 'A Sudanese Sirius System' by M. Griauze and G. Dieterlen	476
II The Moons of the Planets, the Planets around Stars, and Revolutions and Rotations of Bodies in Space Described by the Neoplatonic Philosopher Proclus	504
III The Surviving Fragments of Herossus, in English Translation	548
IV Why Sixty Years?	564
V The Meaning of the E at Delphi	579
VI Why the Hittites were at Hebron in Palestine	584
VII The Dogon Stages of Initiation	592
VIII A Note about Freemasonry	596
Bibliography	608
Notes to the Plates	636
Index	645





# *The Sirius Mystery*



## CHAPTER ONE

# The Sirius Mystery Today

How could the ancient and secret traditions of an African tribe contain highly precise astrophysical information about invisible stars in the Sirius star system? Some of it has only been discovered very recently by modern scientists, half a century after it was recorded by anthropologists studying the tribe.

The situation regarding *The Sirius Mystery* has changed completely since the initial edition of the book was published in 1976. At that time the Dogon tribal tradition insisted upon the existence of a third star in the system of Sirius which modern astronomers could not confirm. Some critics said this proved the hypothesis of the book to be false. If the Earth had been visited by intelligent beings from the system of the star Sirius in the distant past, and they had left behind all this precise information about their star system, the fact that they described the existence of a third star, a Sirius C, whose existence could not be confirmed by modern astronomy rendered the whole account untrustworthy. However, the existence of Sirius C has now been confirmed after all.

The basis of science is that you put forward a hypothesis containing a prediction, and you then seek to verify or refute that prediction. If the prediction is confirmed, the hypothesis is considered to be verified. The hypothesis of *The Sirius*

## THE SIRIUS MYSTERY

*Mystery* has now been verified in a dramatic fashion. In 1976 and in the years immediately following I predicted on numerous occasions that the existence of a small red dwarf star would be verified in the Sirius system, to be called Sirius C according to the standard naming schemes of astronomy (there already being an A and a B). This has now happened. In 1995 the French astronomers Daniel Benest and J. L. Duvent published the results of years of study in the journal *Astronomy and Astrophysics* stating that a small red dwarf star, Sirius C, seems to exist in the system of the star Sirius.<sup>2</sup> They have detected a perturbation which cannot be explained by any other means.

This verification is a highly specific astrophysical prediction which has now been confirmed. It is not as if I had predicted that, say, a comet would approach Earth during 1997. There are many comets, and one might approach Earth at any time. But when one predicts that a star will be discovered in a specific star system and that it will be a particular type of star, and when this indeed happens twenty years later, that is rewarding.

What is the hypothesis, then, which has been so startlingly confirmed in the best traditions of science?

It is that our planet has at some time in the past been visited by intelligent beings from the system of the star Sirius. This suggestion is no longer considered as astounding as it was in 1976. After all, *The Sirius Mystery* generated enormous discussion around the world, and has done so continuously since its appearance. Many years have passed and public opinion has undergone a sea change. This book seems to have founded a genre of books, and there are several bearing the names of Sirius or Orion in their titles. In the 1970s it was the 'New Agers' who were the first to adopt the sentiments of *The Sirius Mystery* and my phrase 'cosmic trigger' even became the title of one of several books

## THE SIRIUS MYSTERY TODAY

discussing such issues at great length. (See Bibliography for Robert Anton Wilson.) I was recently surprised to learn that the Internet has many web sites discussing *The Sirius Mystery*, and there seems to be a whole Sirius Industry out there in cyberspace somewhere. A friend recently asked me 'Don't you ever use a search engine to look up "Sirius", "Dagon", etc.' I have to admit I don't. Although I do use the Internet, I don't have time to consult web sites discussing my own work. I leave that to others - but I'm glad to learn that the interest is so large, and I just hope that they've got all the information correct.

Many of my pleas in 1976 have been answered. For instance, a young man read the appendix about Proclus and decided to do his PhD about him, and has now published a very extensive book on the subject of Proclus (see Postscript to my Appendix II). Another man read my book in 1977 while travelling in Egypt and decided to undertake his own researches relating to the subject, his name is Robert Bauval, and his articles and his book *The Orion Mystery* have explored some fascinating possibilities about the Sirius cult and the Egyptian pyramids. He contacted me several times and when we finally met he urged me strongly to revise and reprint this book. I took his suggestion seriously, as you can see.

Since the original publication of *The Sirius Mystery* was a whole generation ago, few will recall the amazing excitement generated by its appearance. No book quite like that had ever been published before. But I had to apologize constantly for talking about little green men, and some close friends dropped me entirely and never spoke to me again because extraterrestrials at that time were not deemed socially acceptable, nor any discussion of them. For instance, an older woman with whom I had had what I thought was a close friendship for years, turned her back on me completely after publication of *The Sirius Mystery*, and mutual friends said it was because I had published something about spacemen,

which she thought was simply an appalling thing to do. A number of British scholars whom I knew used to ridicule the fact that I had discussed something as lowbrow as spacemen, and I was therefore clearly not a respectable person.

But the critical reception of *The Sirius Mystery* in the British press in its first year was universally ecstatic. It got favourable lead reviews on the day of publication in *The Times* and the *Telegraph*, and then a seemingly endless mass of reviews in nearly every newspaper and magazine in Britain

all favourable. No one was more surprised than my publisher, who had dragged his feet for about three years after delivery of the manuscript before the book came out. (My advance for the book was £500, if you want to know, and no royalties were due for three or four years after delivery because of publication delays.) But the book then went on to become a worldwide bestseller, even in such unexpected places as the former Yugoslavia. The country where it was most appreciated was Germany, where it was on the bestseller list for more than six months. Soon after initial publication the book was favourably reviewed in a lead review by a professor of astronomy for *Nature Magazine*. Later it was reviewed in *Time Magazine*. It was featured on a *Horizon* programme on BBC Television (also a *No. 12* programme on PBS in the USA). The British astronomical community, which is not an arrogant community, seemed relatively unshocked by my book. This was possibly because a number of leading astronomers knew me, and I had 'done the right thing' by first airing the subject matter in *The Observatory*, published by the Royal Greenwich Observatory.<sup>1</sup> This had gained the personal support and backing of Professor William McCrea, who as a President of the Royal Astronomical Society, Gold Medal winner, and one of the nicest people in England commanded universal respect and affection amongst his colleagues. So much was I accepted as part of the background radiation, albeit a rather aberrant part

of it, that some good-humoured joking about me appeared in *The Observatory*. I was thrilled when a spoof appeared in their joke issue of October, 1977,<sup>4</sup> as I enjoy anything of that kind. In Germany some cartoons about the Sirius Mystery appeared in newspapers, and that delighted me too. A newspaper cartoonist in America spoofed the Sirius Mystery, and Faith Hubley, an Oscar-winning film animator, did some charmingly fey animated films inspired by it (only generally inspired, so no income alas). I remember going to see her in New York and holding her three Oscars all at once – how many people have *three* Oscars on view in their sitting rooms? I certainly met a lot of interesting characters through the Sirius Mystery. But others I avoided. For instance, the late Timothy Leary was very keen for me to join him in California for some joint grooving on the subject of Sirius, after he got out of prison, but the idea of such a thing was so repellant to me that it still makes me shudder. There is nothing I hate quite so much as drugs and the drug-culture.

*The Sirius Mystery* had many strange and unexpected consequences in the world of the arts, of all things! The German composer Karlheinz Stockhausen was inspired to write a symphonic poem entitled *Sirius* and announced to the world that he had visited Sirius and that he used compositional techniques learned there. Music from the Sirius system was different – he said it was like *his*! The novelist Doris Lessing was, according to a mutual friend, originally inspired by it to write her series of five science fiction novels, the first of which was entitled *Shikasta* and is the diary of an alien with a mission to Earth. In her introduction to the novel, written in 1978, she mentions the Dogon tribe and the *Epic of Gilgamesh*.<sup>5</sup> Another of the volumes was *The Sirian Experiments*,<sup>6</sup> which I went out of my way to solicit an opportunity to review in a London magazine at the time, to attempt to counteract a dismissive review of *Shikasta* published earlier by Tim Heald, whom I knew in days of yore

and who had slammed Doris Lessing for writing science fiction. (She later wrote and thanked me for 'being a good friend') I found her foray into this genre extremely interesting. She has been so much influenced by Idris Shah's Sufi movement that she has developed many profound philosophical notions, and it is a great credit to her that these include an awareness of the importance of Earth's relationship to other worlds. The fact that such a major novelist was prepared to write five serious novels about extraterrestrial intelligence is important, but unfortunately a great many people amongst the literati resented it and were contemptuous.

My own personal experiences in the aftermath of the publication of *The Sirius Mystery* have been in many ways lamentable. What did please me was that so many people wrote to me with such interesting ideas and suggestions - far too many for me to consider thoroughly. I wish that one day I would be able to find time to go through these letters and make a proper study of some of the ideas in them. I had to give up replying to people, as there were too many of them. And of course there is the strange phenomenon of 'nut mail'

but you never know for sure and it is often a good idea to keep it. One man who was obsessed with the Bermuda Triangle and claimed to have sailed through the area extensively making strange discoveries wrote to me telling me that people were trying to kill him. I thought he was indulging in paranoid fantasies. But he was later really murdered, and his limbless body was washed up at Canvey Island in Essex. I was able to give his letters to the police as part of a murder investigation, although at first the police tried to brush me off and only accepted the evidence after the *Daily Telegraph* threatened to run a story about their negligence in a homicide. A somewhat disturbed American girl who was a millionaire followed me round the world asking me to father her 'starchild' and was a terrible nuisance until her family had her commit-



ted and took her money away from her then she wasn't able to pay for the air tickets anymore and I was left in peace. I often think of the £25,000 in cash which she said she had buried beside a runway at Birmingham Airport as a 'hedge against inflation'. Not only has it declined in value by now, but it must be very soggy. The other people she was obsessed by were the Moody Blues, a pop group who must have become as sick of hearing her babble on about me as I became of hearing her raving about them.

But the sad part of the aftermath of *The Sirius Mystery* was the extreme and virulent hostility towards me by certain security agencies, most notably the American ones. Since I am myself an American by origin, I found this insulting and distressing. On several occasions I was targeted in ways so extreme that they seemed to me hysterical beyond all belief. I am certain that false information was entered into my security files to blacken my reputation. I was blackballed even in some organizations which seem to me so harmless that I still cannot understand it. To give an example, I was co-editing a magazine at one time and decided to join the Foreign Press Association in London so that I could have lunch there and get a press pass. I was told I needed two members to recommend me, and was given names of two American journalists in London who should be happy to do so. So I asked Bonnie Angelo of Time-Life, and she was delighted (I later wrote for her London bureau for several years and did British science reporting for *Discover Magazine*). I then went to another man who was equally friendly and he said he would, and signed my form. That particular man, whom I do not wish to identify, had certain connections in Washington, if you take my meaning. A few hours later, Catherine Postlethwaite, the Secretary of the FPA, told me she had had a hysterical phone call from the man insisting that he wanted to use his blackball against me and stop me joining the FPA. She was completely astonished

and said to him he had just signed my form and now on the same day he was trying to blackball me, and how could he possibly explain that? He refused to explain, but was relentlessly insistent. She and the Council took the view in the end that the man was acting unreasonably, for whatever motives, and they overruled his blackball. But I recognized a pattern of behaviour which has assailed me on many occasions. There was another time, for instance, when I had commenced what was meant to be a profitable association with a man I knew to make several series of corporate videos, with me as writer and co-producer and his company providing the finance and facilities. We made one video and suddenly everything stopped mysteriously. After some time he told me 'I really wanted to do these projects with you, but I can't, and even though I am not supposed to tell you, I felt that I owed you an explanation. The fact is that I have had the CIA from America on the phone to me practically every day for the past three weeks harassing me and telling me I must not work with you, and as much as I like you, my life isn't worth living with this kind of continual pressure and interruption of my work every day by hysterical American officials. So that is the reason, and the only reason, why I am withdrawing from our projects together.' I thanked him for being so honest with me.

Several other people were as well. Indeed, one old fellow I was friendly with, retired Brigadier Shelford Bidwell, actually told me that he had been asked to read *The Sirius Mystery* and write a thorough report on it for the British security services. He had found it rather difficult because it was not his kind of subject! He hadn't meant to tell me this, but he slipped up when chatting over tea and said by way of being pleasant how interesting *The Sirius Mystery* was. When I expressed astonishment that he had read something so far from all his other interests, he first said that he had read every word meticulously, as if that explained everything. When I

protested that this was really quite unbelievable, he had to explain why he had done so. He was so sheepish and embarrassed that I spared him further questioning so that he wouldn't have to spend the rest of his life with a security breach on his conscience. Another old friend, whom I had known when he was a policeman in a panda car and who is now a famous British police commissioner, said he had been approached by MI5 to do a security report on me. He had found it disturbing that there was such suspicion attached to me, and he couldn't explain it, since he wasn't given an explanation himself. He tried to tell them there was nothing at all suspicious about me and that he knew me well, and he wrote up everything he could find out about me trying to demonstrate that I was harmless. But they didn't seem to want to be told that and were obviously unsatisfied, which disturbed him even more.

This persecution went on for more than fifteen years. It cost me income, career opportunities, advancement, and friends. I often wonder about it, especially the frenzied aspects of it. Why were so many people in high places foaming at the mouth in such an uncontrollable manner? Just what was it that I had done? I have never known.

In my opinion, based on both instinct and information, it was the Soviet Union which was most active in suppressing serious study of both extraterrestrial intelligence and paranormal phenomena. It may seem ironic, that although the American CIA persecuted me for so many years, I lay much of the blame for this with the Soviet Union, acting through their agents, the Aldrich Ames types.

I believe the CIA was both duped and manipulated by Soviet agents in its midst, not just with regard to myself but also many similar subjects. The Soviet Union was absolutely determined to have a monopoly on paranormal research, for instance, and would stop at nothing. I believe they actually

## THE SIRIUS MYSTERY

'took some people out', by administering drugs to them which damaged their brains, leaving them alive but in such a confused state that they would discredit themselves. I met at least two brilliant scientists involved in paranormal research who later underwent such drastic personality changes, substantially deprived of their rational powers, that they appeared to have become converted into mental zombies. Both lived in America, and must have been targeted by the KGB. Wise people involved in such subjects take extensive precautions. Uri Geller, who once contacted me and asked me to come and see him, I found living in isolation in a huge house in Britain surrounded by guard dogs and security devices. I'm sure he has his reasons. And it was chiefly about the threat he perceived from the KGB that he wished to talk to me. That was before the collapse of the Soviet Union. Naturally I was inclined to agree with his fears. (Uri did say, by the way, that he had never actually read *The Sirius Mystery*. He said that he only reads paperbacks which he can fit onto his exercise bicycle. He is very keen on keeping fit, and sometimes cycles frantically in his shorts while he talks to visitors. Whilst he was talking to me about the KGB he was engaged in this desperate exercise, fighting the war against fat.)

There were two employees of NASA who made attacks on me which I thought went far beyond mere critical disagreement. This was all the more distressing for me because I had been friends for some years with a delightful man, Captain Robert Freitag of the US Navy, who was Deputy Director of the Advanced Programs department of NASA's Office of Space Flight. Bob Freitag and I met through Arthur C. Clarke and when he came to London, Bob and I would often meet for dinner, as we were both very keen on good food and I would try to find something unusual, such as a Hungarian restaurant. On a visit to Washington I called in to see Bob Freitag and he said he had a very bright fellow

who worked for him called Jesco von Puttkamer, whom he wanted me to meet. He called him in and I told them both about *The Sirius Mystery*.

This man was actually *Baron* Jesco von Puttkamer, and I believe he was one of the Germans who came to the United States with Werner von Braun. But I was shocked when later von Puttkamer maligned me in an astonishing manner on official NASA writing paper (in German) to my German publishers, a separate arm of which had apparently asked him to review my book for a journal. The letter said (11 July 1977) of me (my translation) that 'he acts like a UFO-follower and leaps directly to the most farfetched hypothesis, which requires an assumption of an assumption of an assumption namely that of extraterrestrial astronauts, simply because he believes it. This is rather religious than scientific. Temple's work in the scientific sense is worthless, the evidences which he puts forward represent no proofs. The thesis which he put forward to my opinion presents not the slightest evidence, not to mention proof.' Von Puttkamer went on to say that he was available to give a lecture in Frankfurt if they wanted him to.

I wrote to Bob Freitag on September 3, 1977, and said 'My German publishers, Umschau Verlag, have sent me a copy of a highly objectionable letter about me and my book *The Sirius Mystery* written to them by your friend Puttkamer on NASA stationery, signing it from the Advanced Programs Office. As this could be construed as an official expression of NASA sentiments, I must ask you to send both to me and to my German publishers a letter disassociating NASA from the sentiments expressed by Puttkamer. (he) says that I used his name in a television broadcast as supporting my hypothesis. This is entirely untrue. He says that I did this 'in a completely fabricated performance which would obviously serve to give the book status'. I am very disturbed at this outpouring of vituperation from your friend Puttkamer.

then goes on to attribute to me ideas which do not appear in my book (such as that the story of Gilgamesh records the visit of spacemen, which is I believe an idea of von Daniken's) based on things discussed in parts of the book, namely the second half, which he admits he has not even read '

Bob Freitag was not pleased by von Puttkamer's behaviour, and Bob wrote to me on September 16, 1977, saying of von Puttkamer

'I was unaware of the contents of his letter and the problem it has caused for you

'First, I hasten to disassociate the Advanced Programs Office and NASA from the views expressed by Mr von Puttkamer. These are certainly his private views. I have instructed him to get in touch with you and the firm to provide quickly the disclaimer that he was speaking privately and not expressing a NASA viewpoint. I remain interested in your plans for a new book and would be pleased to be kept up to date on your plans and progress. I would like the opportunity of discussing this in London.'

Von Puttkamer followed with a letter dated October 7 1977, saying of his views: 'It does not represent anything like an "official NASA position". The use of the stationery may have given you that impression (using it was a thoughtlessness which I regret) . . . I regret that this caused the appearance of an "official expression of NASA sentiment" to you.' He also said that he had not meant to attack me personally. Despite being a NASA scientist he had also put forward a very weird hypothesis, astronomically completely impossible, that Sirius B had once been visible to the naked eye. Such ignorance of astrophysics surprised me; his statement completely ignored the parallax which would prevent Sirius B, whatever kind of star it was earlier in its history, from being differentiated from Sirius A by the naked eye. So much for Jesco von Puttkamer, who never entered the fray again.

But it was much more difficult to deal with the behaviour of another NASA employee, who was not under Captain Freitag and whose actions could not be so easily rebuked. I do not propose to name this man, but his activities were revealed to me by Arthur Clarke who telephoned me from Sri Lanka telling me that the man, whom he did not previously know, had contacted him in order to criticize me very stridently. Arthur said he thought I ought to know this because he had the impression that the man was contacting quite a lot of other people in the same way, one of whom was Isaac Asimov (whom I knew only slightly). He believed there were half a dozen other people 'of equal importance and stature' to whom this man was maligning me.

In 1977 the BBC made a 90-minute television documentary special for their series *Horizon*, entitled 'The Case for the Ancient Astronauts'. I was contracted as a researcher, which was my first television job. I was originally supposed to be the subject of the entire programme, but the producer, Graham Massey, became more interested in discrediting Erich von Daniken, so most of the programme was devoted to that. Graham did an incredible demolition job on von Daniken, I did not prepare that material, but worked only on my own subject matter. The last 15 minutes of the programme were devoted to the Sirius mystery, which Graham treated very fairly indeed, contrasting it as a 'respectable theory' with what he considered the nonsense of von Daniken. From the script, which I have, I see that the narration of the programme stated of myself that 'He is an assiduous, careful, and extremely knowledgeable researcher'.

While the programme was being prepared, Graham kept getting phone calls from a stranger in America. Finally Graham told me about them. He said the man was ranting and saying 'you must not let Robert Temple on television' (Also, it appeared that the man in question was available for

## THE SIRIUS MYSTERY

an interview himself at any time!) Graham told me: 'I told this annoying man that I am the producer of the programme and I make my own decisions about who appears in it and who doesn't, and would he please stop calling me all the time.' The man apparently kept mentioning that he worked for NASA, and Graham was doubly annoyed that there seemed to be the implication that the American authorities did not think I should receive media attention. The man was the same one who had phoned Arthur Clarke. NASA was never disassociated from this man's activities and attacks against me.

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I want to turn now to important new subjects which I have not discussed in this context before. I have some observations on the pyramids of the Giza plateau, and on the Sphinx.

It is often said that the Egyptian Sphinx is a large statue with the body of a lion and the head of a man. I can see no reason for this. People said with as much confidence a hundred years ago that the Sphinx was a large man's head sticking out of the sand. Now that it has been cleared and we can see that the head is attached to the body of an animal, everyone assumes that the body is a lion's body. But surely this is a case of the 'Emperor's New Clothes'. I cannot see any lionine features in the body of the Sphinx, unless one were to say that because it has four legs and four paws and a tail, it must be a lion.

There is no mane. There are no prominent muscles in the chest above the front legs, as are often shown in statues of lions. The tail does not have the tuft at the end which lions have, and which statues of lions also have. But most telling of all, the rear haunches do not rise up above the level of the back, bulging and prominent. The back of the Sphinx's body is straight. But if you look at an Egyptian hieroglyph of the



letter 'r' you see a lion's crouching body in profile and realize that lions were portrayed in Egypt with huge rear haunches rising well above the line of the back. We all say the Sphinx is a lion because we have been told it is a lion. We see with the eyes of the unknown and anonymous people who 'say' it is a lion. We have all accepted secondhand information without checking its validity.

If the Sphinx's body is not a lion's body, what kind of body is it?

It looks more like a dog's body! Representations of the god Anubis, who was portrayed as a canine — probably not actually a jackal (although he is often called a jackal) but is more probably a dog (from whom the modern Pharaoh Hound is thought to be partially descended) — show a crouching animal the line of whose back is more or less straight, like that of the Sphinx. And its tail often curls round in the same way as that of the Sphinx, and it has no tuft on the end. Furthermore, it has no mane and no muscled chest.

To me it makes much more sense to suggest that the Sphinx was Anubis, and that originally he was guarding the sacred precinct of the pyramids at Giza. If, as has often been suggested, the head was recarved by a megalomaniac Pharaoh in his own likeness, it may have been recarved from an Anubis head. The current head of the Sphinx is disproportionately small in comparison to the body, as many people have pointed out. It certainly does appear to have been substantially cut down from a much larger original head. But be that as it may, the body of the Sphinx could well be a dog's body, not a lion's.

I believe it is inevitably the case that the pyramid complex at Giza has symbolic celestial importance. And if this be so, then the Guardian of the complex should be the Egyptian Guardian par excellence — Anubis.

There is another aspect of the Sphinx, about which so much has been said in recent years by other authors, which

seems to me a red herring. John Anthony West has become the central figure in this debate, which concerns the water erosion which is so evident at the Sphinx. As far as I know, I was the first person to publish West's theories on this subject. From 1978 to 1980 I was co-editor of an American magazine called *Second Look*, and my co-editor Randy Fitzgerald and I agreed to publish West's interesting article 'Metaphysics by Design: Harmony and Proportion in Ancient Egypt', in which West first aired the matter of the water erosion. I recently gave a copy of this to West, who had none and had forgotten all about it. The article appeared in the June 1979 issue.<sup>7</sup> Later in the same year, West's book *Serpent in the Sky: The High Wisdom of Ancient Egypt* appeared.<sup>8</sup> West's book was very badly edited and constructed, as I have told him personally, and it did not make the impact it should have done with the public. A surprisingly large proportion of the book consisted of disconnected quotations from a variety of books which were not integrated into the text nor subject to any kind of comment, these were all placed in a very large margin which ran throughout the book. A large amount of material about the Dogon appeared in this fashion, and two pages of marginalia relating to *The Sirius Mystery*.<sup>9</sup> Though suggestive, all of this material was not marshalled towards any kind of a thesis. It is best therefore to give West's actual thesis in his own words: '... the earliest calculation would place the founding of Egypt around 30,000 BC., the latest around 23,000 BC. "Atlantis" can no longer be ignored by anyone seriously interested in the truth.'<sup>10</sup> West therefore suggests that Egyptian civilization cannot be less than 25,000 years old, and may be 32,000 years old.

In his book, West states that the Egyptian civilization did not develop, but was a legacy. I am inclined to agree with him and that is an elegant way of putting it. I also agree with him so far as to say that an origin could well go back to 4240 BC (the commencement of something called the First Sothic

Cycle, connected with the heliacal\* rising of Sirius),<sup>1</sup> and in any case *must* go back to approximately 3500 BC. However, at that point we diverge, because West makes it very plain that he believes the legacy came from a lost Atlantis'-type of early civilization native to this planet, and he dismisses people who drag in 'extra-galactic' origins to explain the Egyptian civilization. West and I are in agreement about many things, such as admiration for the Egyptologist Schwaller de Lubicz and enthusiasm for Pythagorean studies. We tend to agree about many aspects of pyramid measurements, and a host of such things. Also, he is well aware that I always suggested in *The Sirius Mystery* that an 'Atlantis'-type of explanation was certainly an alternative possibility to the extraterrestrial hypothesis. The trouble is that I do not personally believe in the viability of the 'Atlantis' theory as presently articulated: it implies an *absence* of extraterrestrial contact. A number of people including West cannot bring themselves to think seriously about extraterrestrials, because their minds do not run that way, I suppose. This is a kind of natural divide which I believe rests more on psychological disposition than intellectual choice. I am friendly with a number of authors who currently advocate the 'Atlantis' hypothesis of a high civilization in the Earth's past where all advanced science was purely of human origin and there was no contact with beings from any other world. I do not support this, and we have had perfectly amicable discussions about our variance of interpretation of origins. At least one of them sees perfectly clearly the strength of the extraterrestrial hypothesis, and realizes he might one day have to amend his interpretation to accommodate it.

I certainly believe that there is much undiscovered possibly under the silt and mud of the Nile Delta - concerning the high civilization of Predynastic Egypt. But the

\* With or just before the sun - this is discussed later

## THE SIRILS MYSTERY

'Atlantis' which is postulated today is too far back, and it leaves *several thousand years* of 'nothingness' in between it and Egypt and Sumer. John Anthony West's suggestion leaves a 'blank' of between 22,000 and 27,000 years! I cannot accept such suggestions. Nor can I accept that the Sphinx is 12,500 years old, even though I believe it and the pyramids were probably built long before the lifetimes of the Pharaohs Cheops and Khephren. But these things are all a matter of degree. In my view, there was ancient extraterrestrial contact with Earth. And I believe that the period of interaction with extraterrestrials and the founding of Egyptian and Sumerian civilization with their help probably fell between 5000 and 3000 BC. We can call the time of this interaction, whenever it was, the Contact Period. I believe that the pyramids and the Sphinx were probably built by the extraterrestrials themselves during the Contact Period, and that the Step Pyramid of Saqqara was a later and magnificent attempt by men working unaided under the human architect Imhotep – since the extraterrestrials had long since vanished – to match those mysterious earlier achievements and show that humans could do such things too. Many of the other Egyptian pyramids then imitated the Step Pyramid, but it can be seen that a lot of them have crumbled into dust and were not very well constructed. Eventually the Egyptians gave up trying to build large pyramids and the so-called 'Pyramid Age' ended altogether.

Without going into it all here, I must note that several authors have discussed extraordinary artifacts which have survived from antiquity, indicating an advanced scientific knowledge. The ancient tradition of maps depicting an Antarctica before it was covered in ice, represented by the Peri Reis Map for instance, is extremely important. In the 1960s I used to discuss these maps for hours with the late Charles Hapgood, the first man to publish anything about them. I believe that

## THE SIRIUS MYSTERY TODAY

these ancient maps do preserve such important ancient knowledge, and they are priceless evidence of advanced science in antiquity. But I do not interpret them as evidence of 'Atlantis.' I see them as yet more survivals of knowledge left by visiting extraterrestrials, who were able to map the Earth from space, and who were able to detect the true continental outline of Antarctica *through the ice* by orbiting space observations in the same way that we can do today. This knowledge was meant to be part of the legacy left behind when the extraterrestrials departed. The whole point is that some of this evidence from the Contact Period was meant to survive and be recognized by men at such time as we developed enough science and technology to be able to do so. I am convinced that *we are meant to piece together the mystery ourselves* from the few clues which have survived. The extraterrestrials do not want to return until we have figured out that they are there. For they are worried about our morale. They do not want to announce themselves without warning: they want *us* to detect *them*. Then they will come. It is all part of the ethics of galactic species interaction.

Now to return to discussing Egypt. West relegated to the end of his book a section entitled 'Egypt: Heir to Atlantis', so that his main point was rather buried, and was easily overlooked by people who did not bother to read his book thoroughly. It was in this section that West emphasized the water erosion at the Sphinx, to which attention had first been called by the late Schwaller de Lubicz. In order to consider the history of how this subject first arose, I give the comments made by Schwaller de Lubicz himself in his book *Le Roi de la Théocratie Pharaonique* (English title: *Sacred Science*) in 1961. In discussing the Sphinx in general, he speaks of 'that Sphinx whose leonine body, except for the head, shows indisputable signs of aquatic erosion'. To this passing remark he appends a footnote which states: 'It is maintained that this erosion was

wrought by desert sands, but the entire body of the Sphinx is protected from all desert winds coming from the West, the only winds that could effect erosion. Only the head protrudes from this hollow, and it shows no signs of erosion.<sup>12</sup> These were the remarks which sent the very observant John Anthony West forth on his quest. West is somewhat at variance with Schwab de Lubicz about the winds, since the latter stresses that the prevailing desert winds come from the west, but West is more concerned about the seasonal *khamseen* winds which he says blow from the south ('the fierce desert wind blowing from the South in the month of April')<sup>13</sup> In any case, West is at pains to assure us that the Sphinx is entirely sheltered from this wind by the Sphinx Temple,<sup>14</sup> so all is well.

Where this subject has gone awry is in what I believe to be the mistaken insistence that the obvious water erosion around the Sphinx can only have been caused by rain at an earlier period of wet weather before Egypt became dry, more than 10,000 years ago—something which is now stated by various authors. This argument is unjustifiably used as evidence for the belief that a high civilization (equivalent to 'Atlantis') existed on Earth about 10,000 B.C. or thereabouts. I do not propose to go into the details of this theory except to consider the Sphinx erosion. Other aspects of the theory are a separate discussion into which I have never entered, and I do not intend to start now, apart from what I said about the ancient maps a moment ago. I published discussions of the technology of the Olmecs (the pre-Maya inhabitants of Mexico and Guatemala) in the 1970s, and in the 1960s I was corresponding with the widow of Arthur Posnansky about Tiahuanaco in Bolivia, I knew Peter Allan, who did the studies of the Tiahuanaco 'Sun Gate', personally I was puzzling over the Nazca Lines in Peru by 1963. I am familiar with many of these fields even though I have not mentioned them here. I have thought about them for more years than

many current authors have been active. I do not dismiss them at all lightly as evidence of an 'Atlantis'. Nor is there any reason to believe that there will not be extraordinary further discoveries in relation to Tiahuanaco, for instance.

But these things must not be allowed to distract us from realizing the strong evidence in favour of a Contact Period. The Dogon and the Egyptians spoke of civilization coming from the Sirius System, and the Babylonians spoke of it coming from the heavens; the Dogon and the Babylonians agreed on the amphibious nature of the beings who did this. The information which has been preserved is astrophysically accurate to an uncanny degree. Its precision is such that the onus is really on those who do not wish to accept the consequences to try and disprove it. So far nobody has been able to do this. My collected replies to various critics may be read in a separate pamphlet for reviewers published with this new edition. But the discovery of Sirius C has in any case rendered most criticism obsolete.

As far as the 'Atlantis' hypothesis is concerned, I believe that the 'evidence of the Sphinx' is nonexistent, as I shall explain in a moment. I do not intend my observations to be discourteous to any individuals, with whom I have friendly relations, and if their theories did not exist I would still be writing about this subject, because it concerns my own work. Let me stress once again, therefore, that I am not making the following points as part of any argument or dialogue with anyone else.

Opposed to John Anthony West and his supporters are the orthodox Egyptologists, who are—as one might expect—horrified at the notion that the Sphinx might be 12,500 years old. However, I believe that both sides are probably in error.

The Egyptologists are in error because in order to counter West's argument, they have been led to deny the existence of the water erosion at the Sphinx. But anyone can see that there is water erosion at the Sphinx, so all the

members of the public who see that with their own eyes think, quite rightly, that the Egyptologists on that point at least must be wrong.

West and his supporters are so astonished at the 'blindness' of the Egyptologists that they are encouraged to make more and more impassioned criticisms of the Egyptologists, thereby driving the harassed Egyptologists ever further into their desperate corner from which they issue supercilious snarls, which the public generally ignore.

This goes to show the lack of resourcefulness of the Egyptologists, and their rather limited capacities. Just as a man who lays the bricks for a beautiful wall is rarely the architect who has designed that wall, so the archaeologists with spade in hand are rarely capable of interpreting the vast array of findings made by their entire professional class, or to make sweeping historical observations, much less to formulate grand theories about their field. I am amazed that the Egyptologists have fallen so readily into the trap of denying the water erosion at the Sphinx, thinking thereby to rid themselves of the heinous notion of a Sphinx 12,500 years old. For they have in that way put a noose around their own necks.

It seems to me that the debate about the Sphinx cannot move forward one inch on either side until we dispense with the assertion of the Egyptologists that there is no water erosion at the Sphinx. It is there for all to see - so we have to accept it! However, it is not at all necessary to assume that if you acknowledge the existence of water erosion at the Sphinx, you have to admit that it was caused more than 10,000 years ago by rain in a previous, less dry era!

There is one obvious thing that both sides in this dispute have overlooked. Anyone visiting the Sphinx or looking at a sufficient number of photos of it can readily see that the Sphinx sits in a deep pit carved out of the rock. We know for certain that that pit has often been filled with the shifting



sands of the desert. Indeed, only in our own time has the pit been cleared out again so that we can see the whole figure of the Sphinx once more. There are still people alive who remember when the Sphinx was only a head sticking out of the sand. The Sphinx had to be cleared in 1816, in 1853, and in 1888,<sup>5</sup> but was half-covered again by 1898, as I see from a photo of that date which I found amongst my grandmother's papers. In 1916 it was again fully covered by sand except for the head.<sup>16</sup>

And here is my helpful suggestion. What if we consider that the pit was once filled with water? I have seen on an archaeologists' plan the indication of an ancient well in either the Sphinx Temple or the Valley Temple which is beside it and the presence of water on the Giza Plateau was substantiated also by the excavation of a number of stone water conduits in 1995 and 1996 (which have now been covered over again, but were photographed before that was done). We also know from ancient texts that the Nile used to rise very high indeed causing floods nearly to the level of the Giza Plateau, in ancient times.

There is some very intriguing evidence for substantial quantities of water on the Giza Plateau to be found in the *History* of Herodotus, the Greek 'Father of History' who lived in the fifth century BC and spent a long time in Egypt, of which he left a substantial account which survives today.<sup>17</sup> In his Book II, Herodotus discusses the pyramids at some length but does not mention the Sphinx at all. It is therefore practically a certainty that the Sphinx was buried in sand at the time of his visit. This is an important point to remember when we attempt to interpret the remarks which he recorded about water on the Giza Plateau. First, in considering the environs of the Great Pyramid, Herodotus strangely states that he was told the following by his Egyptian informants:

## THE SIRIUS MYSTERY

They worked in gangs of a hundred thousand men, each gang for three months. For ten years the people were afflicted in making the road whereon the stones were dragged, the making of which road was to my thinking a task but a little lighter than the building of the [Great] Pyramid, for the road is five furlongs long and ten fathoms broad, and raised at its highest to a height of eight fathoms, and it is all of stone polished and carved with figures. The ten years aforesaid went to the making of this road and of the underground chambers on the hill whereon the pyramids stand [i.e., the Giza Plateau], these the king meant to be burial-places for himself, and encompassed them with water, bringing in a channel from the Nile <sup>18</sup>

This passage has been largely ignored by Egyptologists. But before we consider its implications, let us consider three further passages in Herodotus.

Chephren also built a pyramid, of a less size than his brother's [Cheops was his elder brother]. I have myself measured it. It has no underground chambers [we now know this to be false], nor is it entered like the other [the Great Pyramid] by a canal from the Nile, but the river comes in through a built passage and encircles an island, in which, they say, Cheops himself lies <sup>19</sup>

And further

Thus far I have recorded what the Egyptians themselves say. Now I will add thereto something of what I myself have seen. <sup>20</sup>

And further still

[The Egyptians] made a labyrinth, a little way beyond the

Lake Moeris and near the place called the City of the Crocodiles. I have myself seen it, and indeed no words can tell its wonder; were all that the Greeks have builded and wrought added together the whole would be seen to be a matter of less labour and cost than was this labyrinth, albeit the temples at Ephesus and Samos are noteworthy buildings. Though the pyramids were greater than words can tell, and each one of them a match for many great monuments built by Greeks, this maze surpasses even the pyramids. It has twelve roofed courts. There are also double sets of chambers, three thousand altogether, fifteen hundred above and the same number under ground. We ourselves viewed those that are above ground, and speak of what we have seen; of the under ground chambers we were only told, the Egyptian wardens would by no means show them, these being, they said, the burial vaults of the kings who first built this labyrinth, and of the sacred crocodiles. Thus we can only speak from hearsay of the lower chambers; the upper we saw for ourselves, and they are creations greater than human. The outlets of the chambers and the mazy passages hither and thither through the courts were an unending marvel to us as we passed from court to apartment and from apartment to colonnade, from colonnades again to more chambers and then into yet more courts.

.. Hard by the corner where the labyrinth ends there stands a pyramid forty fathoms high, whereon great figures are carved. A passage has been made into this underground.

Such is this labyrinth; and yet more marvellous is the Lake Moeris, by which it stands. This lake has a circuit of three thousand six hundred furlongs, or sixty schoens, which is as much as the whole seaboard of Egypt. Its length is from north to south, the deepest part has a depth of fifty fathoms. That it has been dug out and made by

## THE SIRIUS MYSTERY

men's hands the lake shows for itself; for almost in the middle of it stand two pyramids, so built that fifty fathoms of each are below and fifty above the water; atop each is a colossal stone figure seated on a throne. Thus these pyramids are a hundred fathoms high, and a hundred fathoms equal a furlong of six hundred feet, the fathom measuring six feet and four cubits, the foot four spans and the cubit six spans. The water of the lake is not natura. (for the country here is exceeding waterless) but brought by a channel from the Nile; six months it flows into the lake, and six back into the river.<sup>2</sup>

And finally

When the Nile overflows the land, the towns alone are seen high and dry above the water, very like to the islands in the Aegean sea. These alone stand out, the rest of Egypt being a sheet of water. So when this happens folk are ferried not, as is their wont, in the course of the stream, but clean over the plain. From Naucratis indeed to Memphis the boat going upwards passes close by the pyramids themselves; the usual course is not this.<sup>22</sup>

From all of these passages we can see quite clearly that in the fifth century BC, when Herodotus was an eye-witness, large stretches of water were far more important in Egypt than we assume today. The amazing account of the Great Labyrinth, of the three unidentified pyramids of considerable size adjoining it, and of the artificial lake, are astonishing in themselves, and have never been satisfactorily explained to my knowledge. Certainly the huge artificial lake sounds like a very good base for visiting amphibians, and is the sort of thing amphibians rather than men would have constructed. But since no one today seems to have much idea of where on earth the ruins of all of this are to be found (although the

Egyptologist Sayce thought it might be near the Pyramid of Hawara<sup>23</sup>), we shall not detain ourselves with speculations on that subject here. I have mentioned it in order to gather together Herodotus's various statements about substantial hydraulic engineering works bringing Nile water in by channels to dry places, and the extent to which the flooded Nile and a huge lake spread water over Egypt to the foot of the pyramids.

Let us now analyse exactly what it is that Herodotus says about the water brought into the Giza Plateau. The account is somewhat garbled, and the fact that Herodotus did not know of the existence of the Sphinx (other than, possibly, a head sticking out of the sand, which he didn't bother to mention, and who is to say even that it was visible?) must be borne in mind. He mentions 'the underground chambers on the hill whereon the pyramids stand, these the king meant to be burial-places for himself, and encompassed them with water, bringing in a channel from the Nile'. The first thing to be pointed out is that the testimony explicitly contradicts any notion that King Cheops intended himself to be buried inside the Great Pyramid! Herodotus clearly states that the king intended himself to be buried in *the underground chambers on the hill whereon the pyramids stand*, meaning underground chambers in the Giza Plateau, not underneath or within any actual pyramid. This very clear evidence appears to have been wilfully neglected by the Egyptological community, who insist that Cheops was the builder of the Great Pyramid and that he intended it as his own tomb. But they are overtly contradicted in this by Herodotus.

The next thing to note is that the burial-places on the Giza Plateau, or at least one of them, were 'encompassed with water'; the word *encompassed* indicates that somewhere on the Giza Plateau an important site was surrounded by water. How could this be without a retaining pit? And where is such a retaining-pit on the Giza Plateau except around the

Sphinx? Now let us look at the second passage from Herodotus, where he speaks of water from the Nile which 'comes in through a built passage and encircles an island, in which, they say, Cheops himself lies'

Is this not absolutely clear? The Sphinx *bears the face of the Pharaoh*, and if encircled by water in the retaining-pit, the *Pharaoh lies there*, just as the Egyptians said, in an island surrounded by water. Whether the face is of Cheops or his brother Khephren matters little, and the two could be easily confused. Although Herodotus says it is Cheops who lies in the island surrounded by water, he does so in the section where he is really discussing Khephren, having already dealt with Cheops, and immediately afterwards he states, 'Chephren, they said, reigned for fifty-six years.'<sup>24</sup>

If we disentangle all of these secondhand accounts recorded by Herodotus, we have a clear tradition in the fifth century BC in Egypt that somewhere on the Giza Plateau (a place where the body of the Sphinx could not then be seen) there was at the time of Cheops and Khephren an island surrounded by water in which the Pharaoh lay. Since the body of the Sphinx would be covered by water and only the head of the Pharaoh would protrude from the water at that time, it was literally correct to say this. The Pharaoh did indeed lie on an island surrounded by water, if the retaining-pit of the Sphinx was full of water, which we suggest that it was. If it were not, then *where is the island on the Giza Plateau? Does anybody know of any other candidate?*

My suggestion is, therefore, that the Sphinx was surrounded by water originally, and for a significant portion of its history. And furthermore, the record of this fact has been sitting there in the text of Herodotus unrecognized for 2,500 years. As for how the water got there, the raising of water by simple wooden devices called norias is very ancient and survives today throughout the Nile Delta. I suggest therefore that from the Nile, from the well in the Sphinx Temple or

Valley Temple, or by the stone water conduits excavated on the Giza Plateau in 1995 and 1996, for much of its history the pit around the Sphinx was a moat, and that the Sphinx was kept artificially surrounded by water. Apparently there is still some water beneath the Sphinx today, a fact which has puzzled modern archaeologists.

The notion of Nile water reaching the Sphinx is in any case well addressed by James M. Harrell, who writes. 'The floor of the Sphinx enclosure is 19.9 to 20.2 metres above sea level. The normal Nile-flood maximum at the Roda Nilometer near Cairo has ranged between 19.0 and 19.5 metres above sea level this century, with exceptional floods reaching elevations of 20.3 metres in 1938 and 21.4 metres in 1874. During the past two centuries, there have been numerous reports of flood water reaching the base of the Giza Plateau.'<sup>25</sup>

If the Sphinx was sitting in a moat for much of its history over thousands of years, this could explain its significant water erosion. The winds on the plateau would have whipped up the water and caused a sloshing motion on countless occasions. This could have been rendered far more erosive by the fact that sand would have blown continually into the water and, in churning with the water, would have had a significant scouring effect on the stone. The moat would have had to be dredged frequently to clear it of the sand, and in the dredging process, great quantities of raised water would pour back down along the sides, not uniformly but at certain points. This corresponds with the observation that the subsurface weathering of the limestone floor of the sphinx pit is greater in some places than others. The fact that there is less subsurface weathering at the rear of the Sphinx could also be explained by the possibility that as the space there is narrow, drifting sand may have regularly accumulated in the water there more readily and to a greater depth, faster than in the more spread-out regions in the other directions. It would

have been a kind of sand-trap. And the effect would have been to insulate the limestone floor at that point from water action. It should be noted also that the head of the Sphinx is considerably less eroded than the body, the reason for this could be that it was never submerged in water (If the 'ancient rain' theory were true, the head of the Sphinx would be eroded to the *same* extent as the body )

Why is it that no one has 'seen' that the Sphinx sits in a moat? And that since the moat was filled with water for much of ancient history, at least prior to the New Kingdom, there is naturally water erosion around the Sphinx?

As I have already said, I do not subscribe to the 'Atlantis'-theory of a high civilization having existed 12,500 years ago. And I certainly do not believe we can invoke the weathering of the Sphinx to try and prove that the Sphinx dates from that time. I believe that the extraordinary things which happened on our planet occurred much more recently than that. It may be shocking to some people, but to me there is nothing unusual in postulating that an extraterrestrial visitation was responsible for kick-starting high civilization on the Earth. It is not really unusual if you believe that the Universe must be filled with life, some of it intelligent. And I believe that that visitation to our planet came from the system of the star Sirius, as the ancient peoples as well as the Dogon have tried to tell us. And since the accounts are of aquatic beings from a watery planet there, it may well be that the reason why the Sphinx – which I believe to have been a statue of Anubis – was sitting in water, was *because the visitors from the planet in the system of the star Sirius were amphibious*. If the chambers said to have been discovered by geologists beneath the Sphinx are filled with water, this may be no accident. If it be true that they are filled with indications or records of some kind, as many enthusiasts of the 'Hall of Records' idea believe (a suggestion made in this book in 1976, by the way), it would make sense that aquatic beings would prefer to leave some



traces of that kind in watery chambers rather than dry ones. And the moat around the Sphinx might then be seen as a simple but brilliant protection device, since only with diving-suits could tomb-robbers hope to break in and steal anything preserved in water-filled chambers beneath the Sphinx moat. These chambers, on the other hand, could readily be entered by amphibians. So I put forward the possibility that this was all done by design.

This is not the place to survey the many attempts to find significance in the measurements of the Great Pyramid: such efforts fill many books. Certainly some are the work of fanatics, especially in the cases where Biblical or prophetic messages are sought in pyramidal proportions. But I believe that some of the geophysical, astrophysical, and mathematical correspondences make sense, and that some of the measurements of the Great Pyramid do represent aspects of the size of the Earth for instance. It has been suggested by many writers that the Great Pyramid represents the Earth's Northern Hemisphere, and that is quite likely to be one of the things it represents. It also appears to incorporate or express the values of  $\pi$  (3.1416) and another natural constant,  $\phi$  (1.618), which is connected with the Golden Section and a series of numbers called the Fibonacci Series. All of this has been discussed by many previous investigators. I am suggesting new insights into the pyramids which should be viewed as additional to those I have just mentioned, and which do not rule out any of the above.

I now see in retrospect that in *The Sirius Mystery* I pioneered a strange kind of thinking whereby stellar constellation patterns were seen as represented on the ground in Egypt. I concentrated on the constellation of Argo, as the reader may see in Chapter Six (a pattern of the key stars of Argo is shown as represented geodetically in Figure 19 in Chapter Six). To me this was a normal way to think, but to

most people it was unusual. Robert Bauval, who has paid generous tribute to my work on many occasions, readily fell in with this manner of thinking and also looked for a stellar pattern displayed on the ground. The result forms the basis for his fascinating book *The Orion Mystery* (1994), in which he points out that the layout of the three main pyramids at Giza corresponds with the three stars of Orion's Belt.<sup>26</sup> Orion and Argo, which we see to have these symbolic presences on Egyptian soil, are the two constellations most associated with Sirius.

However, an enigma remains. Surely there are direct associations with Sirius itself - but what are they? Bauval explains how the southern shaft of the so-called King's Chamber of the Great Pyramid in ancient times pointed to the constellation of Orion, he then worked out that the southern shaft of the so-called Queen's Chamber pointed directly at the star Sirius.<sup>27</sup>

I have now discovered a farther association, which I suspected in the 1970s, when the existing astrophysical measurements were imprecise so that my instinctive hunch could not be confirmed. Now, however, the astrophysical measurements available since the publication of the new figures in *Astrophysical Data* in 1992 make it possible for me to suggest this correspondence, which I had been disappointed that I could not make earlier because the figures appearing in the former reference book *Astrophysical Quantities* in 1973 were, it now turns out, inaccurate and did not yield the intuitively sensed correspondence which I strongly felt at that time.

I am referring to the strange fact that the Great Pyramid stands beside another pyramid which is nearly but not quite the same size. This always seemed to me very peculiar, and I felt that it must symbolize something - but what? I look upon the Great Pyramid as being associated with the Sirius cult and I felt that it must represent the star Sirius B. I knew that

## THE SIRIUS MYSTERY TODAY

our own sun had a mass nearly but not quite that of Sirius B, or perhaps (according to the obsolete 1973 figures) it was the other way around. Couldn't the two pyramids represent by some key measurement of theirs the relative masses of our sun and Sirius B? However, it was not possible to pursue this notion in the 1970s because at that time the mass of Sirius B was incorrectly believed to be 0.98 that of our own sun,<sup>28</sup> and such relative measurements did not correspond to the two pyramids. However, that situation has now changed. According to the new figures, Sirius B has a mass 1.053 that of our sun.<sup>29</sup> The new figures also suggest that Sirius B has a radius 0.0078 that of our sun.<sup>30</sup>

It is now possible to make a correlation whereby the Great Pyramid may be seen to represent Sirius B and the Pyramid of Khéphren may be seen to represent our sun.

If we follow this line of reasoning, we find a correlation accurate to two decimal points. The way I have arrived at it is this: according to the leading authority on the pyramids, Dr I. E. S. Edwards, the measurement of each side of the base of the Pyramid of Khéphren was originally 707.75 feet.<sup>31</sup> As for the Great Pyramid, Edwards says that the original measurements of the four sides of the base were: North 755.43 feet, South 756.08 feet, East 755.88 feet, and West 755.77 feet.<sup>32</sup> The mean of these four measurements is 755.79 feet. If we compare the mean side of the base of the Great Pyramid with the side of the base of the Pyramid of Khéphren, we find that the larger measurement is 1.0678 that of the smaller. We know from the new astrophysical data that the mass of Sirius B is 1.053 that of our sun. The correspondence is thus accurate to 0.014. However, even this tiny discrepancy may be highly significant. For 0.0136 (which rounded off is 0.014) is the precise discrepancy between the mathematics of the octave and the mathematics of the fifth in harmonic theory, where 1.0136 is referred to as the Comma of Pythagoras, and was known to the ancient Greeks who are

said to have obtained knowledge of it from Egypt

A value of the Comma of Pythagoras computable to an astonishing nine decimal places appears in the form of an arithmetical fraction preserved in the ancient Greek Pythagorean treatise *Katatome Kanonos* (Division of the Canon)<sup>33</sup> There we are told that the number 531,441 is greater than twice 262,144 Twice 262,144 equals 524,288, though this number is not actually stated The ratio is not computed in the text either, but if we carry out the division we obtain the number 1.013643265, namely, the Comma of Pythagoras expressed to nine decimal places The Greek text is coy in the extreme, giving the information in such an obscure manner that only someone initiated into its significance could be expected to have any idea what was being said The only explanatory comment earlier in the passage is: 'Six sesquioctave intervals are greater than one duple interval.' One has to be fairly well educated in these matters to have any idea at all of what the author means Andre Barbera, the immensely learned modern editor and translator of this text, has apparently not noticed that this passage, which he has translated from no less than three separate versions, in fact presents obliquely the mystery of the Comma of Pythagoras He does not mention the Comma, has evidently never carried out the necessary multiplication and division to arrive at it, and gives no indication whatever that he is aware of the special significance of the passage.<sup>34</sup> If Barbera, who is probably the world's expert on this text, has no inkling of its true importance, then it is no wonder that no one else until now has either

The actual author of the strange treatise from which this comes is unknown Certainly the material in it, according to Barbera, could have been put together in some form in the fifth century B.C. or at the turn of the fourth century B.C.,<sup>35</sup> and reworked some centuries later.<sup>36</sup> But some of the *content*, and in particular the key reference to the Comma of Pythagoras,

appear to come from very ancient and unidentified Pythagorean sources which cannot be traced today. There seems to have been an actual, and typically Pythagorean, attempt to *state but conceal* the main mystery. No overt statement of the important number is given, and even its computation requires two successive arithmetical operations, the carrying out of which would not even occur to anyone who didn't know what he was looking for in the first place. The nine-decimal value of the universa constant, the Comma of Pythagoras, is therefore concealed in this ancient text in a kind of code, but one which is entirely unambiguous once it has been recognized as such. The ancient text is so extraordinarily dry, technical and boring, that only expert musical theorists would ever have read it, and of those, only a handful of initiates would have deciphered the purposely concealed reference to one of the greatest discoveries ever made in ancient science and mathematics. The text therefore seems to have been intended, amongst its other, more mundane discussions, to preserve this secret Pythagorean (and originally Egyptian) knowledge whilst biding it so carefully that its preservation would await discovery by the right kind of person.

I have done a great deal of work on the Comma of Pythagoras over many years, and I found it necessary to give a name to the decimal increment 0.0136 itself. I have named it the Particle of Pythagoras, which I hope will be found acceptable by others. Should anyone but myself ever wish to discuss it, of course, I believe the numerical coefficient of this Particle, 136, is related to the 136 degrees of freedom of the electron discussed by the famous physicist, the late Sir Arthur Eddington,<sup>2</sup> and that the number plus one gives the Fine Structure Constant of nuclear physics, which is 137.<sup>38</sup> (The Fine Structure Constant is a universal natural constant greatly beloved by physicists, although hardly anyone else has ever heard of it.) I have discovered relationships between

this natural constant and several others such as  $ph$ ,  $e$ , and  $p$ . However, such discussions are too lengthy and distracting for inclusion here. I mention this only so that readers will understand how important the Particle of Pythagoras really is. Essentially, one could say that it expresses the *minute discrepancy between the ideal and the real*. For the pyramid builders to incorporate it as the identical discrepancy just discussed in the Sirius and pyramid correlation should be interpreted as their way of signalling to us: 'This is a symbolic representation of a real cosmic fact.'

Musical theorists will be well aware that the discrepancy 0.0136 necessitates the tuning technique known as 'equal tempering'. I have published an account of the invention of the Equal Temperament system elsewhere.<sup>39</sup> As if to tease us, the builders of the pyramids appear to have left a microscopic discrepancy in the correlation precisely equal to a universal numerical constant. For the Comma of Pythagoras is implicit in the structure of the Universe itself, and is absolute throughout the cosmos.

However, another point should be made about this correlation. That is, the ratio of 1.053 is actually the precise value of the sacred fraction  $256/241$  mentioned by Macrobius at the turn of the fourth/fifth centuries AD, who describes its use in harmonic theory by people who to him were 'the ancients'.<sup>40</sup> The fraction was also mentioned in antiquity by the mathematical, harmonic, and philosophical writers Theon of Smyrna (second century AD), Gaudentius, Chalcidius (fourth century AD), and Proclus (fifth century AD, for whom see Appendix II of this book, as he seems to have been aware of the Sirius Mystery).<sup>41</sup> One must ask how it is that this precise value of 1.053 which we see is astrophysically the precise ratio between the masses of Sirius B and our Sun, was mentioned so frequently in the works of writers dealing in esoteric astronomical lore in ancient times, one of whom (Macrobius) is prominently identified with the

heliocentric theory, and another of whom (Proclus) appears to have been initiated into the Sirius Mystery and specifically mentioned the existence of important but invisible heavenly bodies. Especially in the case of Proclus, who appears to have known of the existence of Sirius B, to have him also mentioning this number, exact to three decimal places, specifying its mass stretches credulity beyond its limits. Surely the coincidences are multiplying to an impossible degree if we are to view this as all being by chance. (As regards him, I recently discovered the following passage in an old book about the pyramids. 'The hieroglyph for Sirius is, oddly enough, the triangular face of a pyramid. Dufeu [a nineteenth-century French author who wrote about the pyramids\*] and others suppose that the pyramid may have been dedicated to this venerated star. Proclus relates the belief in Alexandria that the pyramid was used for observations of Sirius.'† Unfortunately, this has come to light just before going to press, and so I have not been able to locate the passage in the works of Proclus.)

But there is also this purely cosmological question: why is it that our Sun and the star Sirius B have a mass ratio of 1.053 in any event? For the fraction  $\frac{256}{243}$  of which 1.053 is the decimal expression does appear to have a universal harmonical status. So by stumbling upon this coincidence we may have uncovered some hitherto unsuspected astrophysical harmonical value in operation between two neighbouring stars. I don't believe anyone before has found a precise numerical correlation which could extend the notion of a 'harmony of the spheres' beyond our solar system, to link it with a neighbouring one. But this appears to be the case here. Perhaps it has something to do with the inherent nature of white dwarf

\* Dufeu, A., *Decouverte de l'Age et de sa Venable Destination des Quatre Pyramides de Gizeh. Principalement de la Grande Pyramide*, Paris, 1871.

† Bonwick, James, *Pyramid Facts and Fancies*, Kegan Paul, London, 1877 pp. 168-9.

stars and their dimensions vis à vis normal stars like our Sun, and this ratio would thus occur throughout the Universe frequently. It makes more sense to view the correlation as one which appeals to underlying fundamentals of cosmic structures than to view it as a special case applying only to Sirius B and our Sun. But even so, the correlation is so extraordinary and so precise that it suggests whole avenues of research and offers the hope of absolute numerical expressions recurring in the cosmos where none had been suspected. And by discovering this, we can only be pleased, since it enables us to discern some scaling elements of concealed structure which may be cosmic in scope. I hope cosmologists will not neglect this observation. I believe it demonstrates that the Universe *has more structure than we thought*, and that that structure can be so precisely articulated that it can generate an exact value of this kind as a ratio between neighbouring stellar bodies. For Sirius B and our Sun, in terms of the cosmos, are certainly neighbours. And it all comes down to this question: how is it that two stars 8.7 light-years apart can have a mass ratio which is not random but which expresses a universal harmonic value which is precise to three decimal points? It can only be because the astrophysics of stars and their evolutionary development (such as in the formation of a white dwarf) follow certain harmonic laws which we have not yet suspected, much less expressed. And we should not overlook the fact that the universal harmonic fraction concerned is not one which today receives any attention. This in turn indicates that it is *ancient* harmonic theory that should be dusted off and studied for clues as to what is going on. Many of us have believed this for years, even without this evidence.<sup>42</sup> One of my 'hobbies' is trying to get to grips with ancient harmonic theory, which is why I took the fraction seriously enough to work out its decimal expression and notice its importance, needless to say: the decimal value of the fraction does not appear in Macrobius, and only someone actually doing the



division and holding up the result beside the mass ratio value of Sirius B and our Sun for comparison would ever have noticed anything at all.

The implication of all of this is that different types of stars express different harmonical values in a surprisingly precise way. But why should stellar evolution *not* have a harmonical nature and structure to it? This will probably be found to be relevant to the concept of the 'stellar mass function' which astrophysicists always speculate about. It may be found, for instance, that the difficulties of star formation in the first place are regularly overcome by some kind of binary star formation. In our own solar system we could view the planet Jupiter as an incipient brown dwarf star in the making, and in 1983 I published an account of the possible existence of another actual small and invisible star in our own solar system, which was first suggested in 1977 by the radioastronomer E. R. Harrison because of a perturbation which he discovered that our solar system was exercising on six particular pulsars in a small region of the sky.<sup>43</sup> Star formation might thus involve a binary process in far more cases than we think, possibly in all. Binary stars may only be able to coexist according to specific harmonic relations, just as certain musical notes when struck together are consonant when they are in specific proportions such as the musical fifth or fourth.

Fundamental to an improved theory will be a realization that star types are expressions or articulations of harmonical ratios and frequencies and that however much variance they may show, even those variations are always methodical and coherent. Any lack of method and coherence which appears in these cosmic occurrences is thus due not to any lack of structure in the Universe, but is due rather to our own lack of understanding of it. We have learned this lesson in any case by discovering that even chaos is ordered, with the marvelous development of Chaos Theory.

## THE SIRIUS MYSTERY

More important is Complexity Theory, which is still in the process of establishing itself. It deals with the sudden onset or loss of long-range order by what scientists call 'phase transitions' and 'symmetry breaking'. I should point out that the mass ratio of Sirius B and our Sun demonstrates that long-range order exists between the two solar systems, extending over a distance of 8.7 light-years, which can only be explained by conceiving of the two solar systems inhabiting the same 'cell' of space. And if that is the case, then we know from Complexity Theory that a strange form of what resembles 'instantaneous communication' subsists in such 'cells' whereby huge macro-regions of space behave as if their elements were not separated by spatial or temporal distance, and the 'cell' engages in what is called 'self-organization'. Such a 'cell' turns into what is called by scientists a 'dissipative structure' which turns disorder into order.

The 1977 Nobel laureate for Chemistry, Professor Ilya Prigogine, whom I have visited in Brussels, has stressed that the onset of complexity in a system can result in the instantaneous extension of long-range order by a magnitude of *ten million or more*, as is easily demonstrated in the onset of so-called Benard Cells caused by thermal convection in a fluid.<sup>44</sup> This enormous expansion of order is equivalent to one fifth of the population of Britain suddenly and spontaneously adopting the same bodily posture at the same instant while having no direct contact with one another. Imagine ten million people suddenly standing on their heads for no apparent reason. An outside observer might call this uncontrollable turbulence, for a hairdresser doing this would start cutting toenails, drivers would lose control of their vehicles, tennis players would invariably hit the net. It would be chaos. But nevertheless, it would not be denied that ten million people had stood on their heads at the same time due to some mysterious long-range ordering principle which

extended across the whole country. This turbulent chaos is in fact a *spontaneous creation of complexity*. For a moment ago the ten million people had absolutely nothing in common about their posture, but now there is no denying that there is an immense complexity in existence, a connection suddenly exists which did not previously exist — a coherence is established. Ten million simultaneous, complex, intricate and criss-crossing links exist: the ten million people have all suddenly stood on their heads *all just like each other*. This is analogous to what actually happens in a Bénard Cell, where ten million molecules instantaneously align.

The discovery of the significance of the 1053 mass ratio between Sirius B and our Sun suggests that our solar system and the Sirius system are elements of a larger entity which is a self-organizing open system — what is called in thermodynamics a 'dissipative structure far from thermal equilibrium'. But let us give it an actual name. I propose to call it the Anubis Cell. The Anubis Cell clearly has long-range order extending over at least 8.7 light years. Since all such structures increase their order and eliminate their disorder, a continuous ordering process must have been in operation inside the Anubis Cell since at least the formation of either our Sun or Sirius B's condensation as a white dwarf, whichever was the later. Long-range order has thus operated between the systems presumably for billions of years. Under such circumstances, both solar systems must have a shared movement in relation to the Galaxy. The two systems must also be in continuous harmonic resonance with one another. It may be presumed that a significant perturbation of one would affect the other, and that this could apply to very high frequency events including 'mental', 'thought' or 'information' events. Membership of the same cosmic cell implies the potential for the modulation of some shared field (of an unknown type, but possibly not unlike the 'quantum potential' proposed by my friend the late David Bohm to

solve the Einstein-Podolsky-Rosen Paradox in physics – a subject we cannot go into here!) for purposes of communication between the systems. Let us call it here the 'cell potential'. In other words, electromagnetic amplitude modulation such as radio, for signalling in the traditional manner, may be unnecessary. The strange aspects of long-range order may mean that in some way yet to be discovered by us, instantaneous communication between the systems might be possible, which would seem to overcome the limitations of the speed of light for communication between them.<sup>43</sup> Psychic communication and even nonmaterial interactions of souls might be possible. The ancient Egyptians said that the Sirius system was where people go when they die. The Dogon say the same thing, and perhaps the Sirius system is the actual location of 'the Other World' in more senses than one. Inspiration may even come to humans on Earth from the Sirius system by harmonic resonance articulated by the (still undefined) Anubis Field of the Anubis Cell, and this might be instantaneously 'transmitted' not as a signal but by harmonic resonance response within the continuous Anubis Field subsisting within this cosmic cell.

We have similar phenomena throughout nature: even the lowly sponge has been found to have a physically impossible 'conduction velocity' for stimulus transmission from one end of its body to another. So bizarre were these findings that the three Canadian scientists involved in studying it were forced to suggest that a sponge was like a single giant nerve cell so that 'the entire conduction system could act as a single neuron'.<sup>44</sup> If a simple sponge can defy time and space at the bottom of the sea, surely the Anubis Cell can do so within the Galaxy. The Anubis Cell may be analogous to a macroscopic 'neuron' seen from the point of view of Galactic scale. And this brings us to another possibility: *the Anubis Cell may be alive*. The vast Ordering Principle may be an Entity. Even if it were not an Entity to start with, it must long ago have

spontaneously generated considerable consciousness, if only by weighted connections in parallel, distributed processing<sup>47</sup> And we can be sure that it has had a few billion years to do its thinking

And if we are to be agreeable and tolerated parasites, perhaps we should give some thought to this problem. It may be that one communicates with the Entity by modulating the Anubis Field with one's thought patterns—a procedure generally known as prayer. However, I do not wish to encourage people to try and receive 'channeled inspiration' from the Anubis Field, because that immediately opens the door to all the world's crazies—every nut in California who thinks he or she is a chosen vessel for privileged communication will start spouting and pontificating in the most offensive manner and pretending to be A.I. Wise. I think we could adopt an unbreakable rule: *anyone who insists that what he says is true is a phoney*. The only people to whom one should ever listen are those who suggest things tentatively, as *possibly true*. Conscious of the need never to insist upon the truth of anything, I want to stress that everything in this book is hypothetical. I have never insisted on the truth of any of it. If it were all disproved tomorrow, I would be surprised but not dismayed. I believe we should never, never accept anyone's insistence upon the necessary truth of a theory which cannot be proved. To do so is to surrender your integrity as an entity yourself. That is why one should never join a religious sect or cult with a leader who says that he knows the absolute truth. There have been several very sinister cults which have adopted *The Sirius Mystery* as a recommended text, but never with my encouragement. I do not, cannot, and will not ever support such cults. Most of them have sensed that and have left me alone personally. All cults are destructive of human integrity. I feel sorry for people insecure enough to join them, the cult leaders exploit their insecurity by offering them spurious 'leadership'. And I

condemn utterly anyone who attempts to make use of my writings or ideas in connection with such activities.

Returning now to our observations of the pyramid measurements, the value of 1.0678 given there may thus also be a double-tease by the builders. For not only does it vary from the precise mass ratio of Sirius B and our Sun by a tiny amount equal to one harmonic natural constant, but it varies from another harmonic natural constant by that same exact amount. One could then say that the builders were only intending to express the latter, ignorant of the astrophysical ratio, but the following additional correlations relating to the Sirius system discourage such a notion.

What about the respective radii of Sirius B and our sun? Are they indicated by the two pyramids? Turning to a different form of measure, the slope angles of the respective pyramids, we find that the sides of the Great Pyramid originally had slope angles of about  $51^{\circ}52'$  to the ground, according to Edwards,<sup>48</sup> which is equal to  $51.866^{\circ}$ , whereas the Pyramid of Khephren had slightly steeper slopes of  $52^{\circ}20'$  according to Edwards,<sup>49</sup> which is equal to  $52.333^{\circ}$ . The slope of the Great Pyramid is thus 0.0089 less than the slope of the Pyramid of Khephren, which yields a value equivalent to the relative radius of Sirius B to that of our sun accurate to 0.0011. The appearance of these two correspondences act as a kind of cross-correlation on each other, since one is accurate to 0.014 and the other is accurate to 0.0011. This significantly reduces the chance of coincidence being at work in these correlations, as there is not only one such correlation but a pair. However there are two more to come.

I am not insisting that these correlations are intended, but suggesting that they may be, considering the established connections already noted between the pyramids and the Sirius cult.

From the latest information about Sirius C in their 1995 article, Benest and Duvent state that Sirius C cannot be much more than about 0.05 of the mass of our sun (and of Sirius B).<sup>50</sup> Using one of the simple length measures of the kind which seemed to indicate the relative masses of Sirius B and our sun, the mass of Sirius C may be indicated by the height of the missing pyramidion (top point) of the Great Pyramid. For it was 31 feet and the original total height of the pyramid was 481.4 feet, according to Edwards,<sup>51</sup> so that the height of the pyramidion was 0.0643 of the total height of the pyramid, corresponding to within 0.01 of the 0.05 of solar mass suggested for Sirius C in 1995.

Thus is thus the third Sirius astrophysical measurement correlation accurate to at least 0.01 to be found in the Giza pyramid complex.

What about the third pyramid in the Giza complex, known as the Pyramid of Mycerinus? What significance could it have in this scheme of things? Edwards says that the Pyramid of Mycerinus originally had a height of 218 feet.<sup>52</sup> The height of the Pyramid of Khephren was originally 471 feet, according to Edwards.<sup>53</sup> The ratio of these two heights is 2.160. We note from Benest and Duvent that the latest estimate of the ratio of the masses of our sun and Sirius A is 2.14.<sup>54</sup> The correspondence is thus accurate within 0.02. This is a fourth possible correspondence.

Can it be, therefore, that the pyramid complex at Giza is representing to us, among many other things such as the value of  $\pi$  and the dimensions of our Earth, the relative masses of the three stars of the Sirius system? They all seem to be there, accurate to the second or third decimal. Nor is that likely to exhaust the possibilities. But any further discussions will have to be left for another time.

When the German edition of this book appeared in 1977, I added a lengthy Nachwort (which is not a sausage but an

Afterword). In it I indulged in some speculations about the aliens, some of which I feel that I should mention here. I pointed out that interstellar travel cannot be easy at the best of times and any aliens capable of it would probably first have to master the technology of cryogenics (or alternatively some other form of suspended animation), so that they could go into suspended animation for the duration of the interstellar part of the voyage. I then suggested that perhaps the whole thing was so difficult that such expeditions were often one-way trips from which there was no return. And that led me to the important suggestion that perhaps the ancient visitors to our planet never really went home. All the traditions seem agreed that they 'ascended to the heavens' and left the Earth. But there is no guarantee that they went back to Sirius. In fact, anyone capable of mastering the technology of suspended animation for an interstellar voyage would find it a simple matter to re-enter that state and then simply to stay put. So that the Nommos\* may very well still be somewhere in the solar system, either asleep or slowly bestirring themselves now that things are getting more interesting down here.

Is there any clue in the traditions as to where any sleeping Nommos might be? There is in the Dogon tradition. For the Dogon differentiate very clearly between the fiery, roaring landing craft which they describe as bringing the Nommos to Earth, and the new star which appeared in the sky while they were here which would seem to be a reference to their larger base parked in orbit. This is called 'the star of the tenth moon'. The Dogon do three drawings of it, showing it in different phases which seem to imply that it could be expanded and contracted as a sphere at will.

When I gave some thought to this I realized the Dogon might be suggesting that the base of the Nommos is parked in

\* The Nommos are discussed in detail later in the book.



the solar system as the tenth moon of one of the outer planets Neptune doesn't have ten moons, so that was out. It didn't take me long to realize that the tenth main moon of Saturn is anomalous in the solar system, and is the only one which seems to have a smooth surface without craters or other lumps and bumps. Its name is Phoebe. It has a retrograde orbit around Saturn widely different from all the other Saturnian moons, so that when our space probe photographed the moons of Saturn, Phoebe was the only significant one which was not close enough to give a good photo. (At the time I suggested Phoebe as a possible artificial body it was several years before this space probe, and I was deeply disappointed that the probe was unable to produce much more information about Phoebe.) Phoebe is about 160 kilometres in diameter, but its mass seems still to be unknown, so that we cannot make statements about its composition. It orbits Saturn every 523 days, 15.6 hours. In 1982, following the *Voyager* results, I asked Brad Smith of the University of Arizona Astronomy Department about Phoebe and he said 'as far as we can see it is *perfectly* round'. He also pointed out that it was too large to be a degenerate cometary nucleus. He said it had only 3% reflectivity.

We should not forget that if aquatic amphibious beings are making an interstellar voyage, they will need fresh water in their ship in considerable quantities. In the ancient legends of the Sumerians and Babylonians about the god Enki (Ea), who was the god who warned mankind about the Deluge so that the Ark could be constructed, Enki was said to sleep in a freshwater receptacle or chamber shaped like the Ark, called the Abzu. Could this be a reference to an amphibian in suspended animation? There is at least one occasion in Sumerian literature (fourth to third millennium BC) where the god Enki is described as behaving like an amphibian: 'Enki, in the swampland, in the swampland, lies stretched out

<sup>155</sup> The context indicates that this is his normal position,

since he continues to lie stretched out in the swampland for a considerable time while his vizier goes in and out. There are two things which are puzzling here: why would Enki lie stretched out, and why in a swampland? If he were assumed to be one of the amphibious fish-tailed beings, that could explain both features. As far as I know, no scholar has ever addressed these problems of Enki lying stretched out in a swampland, and it has just been ignored. But as Enki was generally described as inhabiting the Abzu, which is filled with water, if you think about it, someone who actually lives in the water really does need a fishtail to get around properly.

As for the 'moon' Phoebe, perhaps it is unlikely that it is an actual interstellar ship. If it really is artificial, then it may be a thin metal shell (hence 'perfectly round') inflated or manufactured here in the solar system, which is essentially hollow, perhaps even largely empty like a balloon, or containing some water at the centre, suitably insulated and heated to prevent it becoming ice. A largely empty sphere might be needed as insulation for a watery core. Amphibians would not need artificial gravity to the extent that we would, because buoyancy in their natural medium would be familiar to them, and their natural life style would be more akin to a low-weight condition.

If Phoebe is a blown-up sphere, it will have very low density and will have an orbital precession due to solar light pressure. It could act as a 'marker' to draw our attention because of its many anomalies, and it could indicate a more important object of interest nearby or somehow in correspondence, which would be smaller and possibly invisible from Earth by ground-based telescopes. Certainly some oddities were discovered at Saturn, such as leading and trailing co-orbital satellites, plus two satellites which periodically exchange orbits with each other, as well as a satellite about the same size as Phoebe (a 'twin') which moves along the leading triangular libration point of the moon Dione. Phoebe was

the only one of the eighteen Saturnian satellites unobserved by *Voyager One*, and it may be a long time before that situation improves. I hope it will finally be observed by the Cassini Probe which will reach Saturn in the year 2004. Phoebe is the tenth satellite of Saturn in terms of size. It is also the tenth proper satellite of Saturn, disregarding the eight small inner satellites and considering them as debris associated with the rings. In short, it might well be the 'star of the tenth moon' of Dogon tradition. If so, it might have been put into its strange orbit both to call attention to itself and to keep it away from the other moons of Saturn both for the sake of safety and to ensure that any photographic missions such as *Voyagers One* and *Two* would not crack its secret too soon, since celestial mechanics would prohibit an early probe to the planet and the other moons which could possibly study Phoebe at the same time. And the aliens would know that no one on Earth would send a probe all the way to Saturn to study Phoebe alone, until the rest of the Saturn system had first been studied. Following that logic, it could be that *Voyager One* might have triggered a local alarm by entering the Saturn system, and thus awakening the Nommos. The whole design might have been that simple and elegant. It avoids artificial or questionable criteria and sets as its absolute threshold the entering of the Saturn system by an artificial probe (of whatever kind, since this plan would enable an alarm to be triggered by an extraterrestrial as well as by an Earth probe). The entering of the Saturn system would thus constitute a tripwire which would have activated the Nommos in 1981.

It is interesting that two years after I published my thoughts about Phoebe, the astronomer D. G. Stephenson published a similar theory in the *Quarterly Journal of the Royal Astronomical Society* relating to the outer planet Pluto.<sup>56</sup> He said he thought that Pluto's eccentric orbit might be artificial, rather in the way I have suggested for Phoebe,

and have come about as a result of the activity of extraterrestrials visiting our solar system. He also suggested the existence of 'space arks' full of extraterrestrials who never went home but continued to breed generations of descendants as they travelled for hundreds of thousands of years through interstellar space. His notion is that such an 'ark' is parked in our outer solar system and that it may have mined and largely stripped the planet Pluto for raw materials. This is eerily similar to my own suggestion. It puzzled me that Stephenson could make a suggestion similar to my own and not be held up to ridicule for it, whereas for making the same sort of suggestion I underwent years of virulent attacks. But I was delighted by Stephenson's imaginative contribution to the debate, and he makes a lot of sense.

We should not forget that the Dogon say that the Nommos will return, and when they do it will be called The Day of the Fish. The first indication of their return, say the Dogon, will be that a new star will appear in the sky—the 'star of the tenth moon' will have returned. Elements which are at the moment retracted inside this body will then re-emerge. Then the Nommos will land on the Earth again in their Ark—the landing craft which makes a lot of noise and emits fire. From this will emerge 'the mythical ancestors', namely the very same personalities who figure in all the myths. This reinforces the notion that they never died and never left the solar system. After their return, this group of Nommos 'will rule from the waters'. So there will presumably be considerable political implications to their arrival! However, it is most unlikely that they will be hostile to humans, since they will have invested so much of their efforts in trying to help this planet develop civilization thousands of years ago that they won't want to see all their work go to waste. They would doubtless be helpful, therefore, but not a little distressed. As aquatic beings, one doesn't have to be a genius to realize that the present state of the world's oceans will greatly upset

them, and they might take drastic steps about that. Can you imagine yourself as a Nommo swimming in the sea, coming up for air only to have a plastic bottle bump against your nose? And number one on their list would probably be the control of oil spills at sea. Think like a Nommo: what would they want most? Clean seas, of course. They are bound to have advanced technologies for cleaning up the seas very promptly. So they will be very popular with environmentalists and will probably form alliances with the world's 'green' parties. Maybe it is the future friends of the Nommos who will be the true 'little green men'.

I speak of all this as if I believed it. Do I believe it? However much verification occurs, the hypothesis of contact with Sirians remains a hypothesis until contact is re-established, and then we don't need to wonder about it anymore because it will have become obvious. My personal opinion is that it is probably true. I don't say that it is definitely true. But the hypothesis gets more convincing all the time, and there are fewer nervous or blinkered people nowadays who wish to dismiss all extraterrestrial contact possibilities as impossible in principle. Of course I am aware of the many articles written by astronomers in such journals as that of the Royal Astronomical Society (of which, after all, I am a Fellow, so I receive it in the post automatically) suggesting that as there seem to be no extraterrestrials around or in contact, maybe we are alone in the Universe after all. But I don't believe any of that.

In the past few years we have learned of increasing numbers of planets discovered by astronomers in other solar systems. Those astronomers who by nature of their psychological dispositions are determined to be sceptical used to take refuge in saying: 'Other solar systems don't have planets.' How well I remember that. Most sensible people always thought that such sentiments were crackpot, and now it has been proved. So then the argument shifted to 'There

## THE SIRIUS MYSTERY

may be planets but they don't have any life ' That too has been called into question by what we know already about Mars. So once again the argument can be expected to shift. 'There may be life, but it can't be intelligent ' And so on. People who are determined to have negative thoughts can always find new ones.

I have mentioned the planet Mars in passing. Do I believe that there was intelligent life on Mars at one time? I would not be surprised at a Martian connection with the Sirius Mystery, as I have thought for some years. I have no idea whether the 'Face On Mars' in the region of Cydonia is really a face or not, but it looks pretty convincing, doesn't it? And I think that a lot of other people must think so too. I thought NASA were supposed to be broke, and now suddenly they are sending ten Mars missions in ten years, and the Russians are joining in. What's going on here? The announcements of the life forms in Martian meteorites seemed pretty orchestrated to me. The first announcements were that evidence of bacteria had been found. This then escalated to worms when nobody shot himself. Then we heard of ice on the far side of the Moon, of water on Europa (one of Jupiter's moons), of all kinds of possibilities of simple life forms on Mars in the distant past, and now of huge floods having swept that planet. More recently still, we are told Mars once had an ocean larger than the Pacific. Still no riots in the streets! These announcements seem to be released as if a doctor were taking the patient's temperature to see if the dose can be increased. By the time this book is in print, doubtless other levels in an escalating series of revelations will have been reached. Who is to say that the *Mars Orbiter* really broke down after all? Perhaps it sent back incontrovertible evidence to the official folk who are in charge of such information, and they pretended that the probe malfunctioned to buy time while they formulated a policy of slow leaks, carefully judged in case of public hysteria. But by now those officials will have

realized that a lot of (Martian flood?) water has passed under the bridge since those heady days of 1938 when Orson Welles's radio broadcast about the Martians landing sent a nation into panic and precipitated suicides. The public is now well and truly conditioned—bring on the extraterrestrials, please!

The danger now would seem to be that the public is so used to a thrill every thirty seconds on television that they would eventually become *bored* by real extraterrestrials, as they will, probably disappoint our fantasy expectations. And, of course, they may be, as the Babylonians said, physically repulsive, though unlike the Babylonians many people today are used to seeing dolphins and whales close up, and natural history films have made the public very familiar with strange-looking creatures. The only people likely to get really upset about extraterrestrial contact will probably be the religious fanatics, who are in any case always upset about something. The very people who can without the slightest qualm believe in blood oozing out of holy statues are going to be the last to accept that religious beliefs can extend beyond this planet, and they will take great exception to the religious centre of the Universe shifting in a kind of theological Copernican upheaval. On the other hand, some of us may find this concept rather comforting and exciting and draw strength from it.

So let us move on now to a much-expanded version of *The Sirius Mystery*, which contains a great deal of new information. There have never been sufficient resources to undertake much of the research that I would have liked. I hope this present version of the book proves useful to those who are interested in these matters, which may affect us all sooner than we think.

Robert Temple  
August, 1997

# THE SIRIUS MYSTERY

## Notes

- 1 There were actually three editions of *The Sirius Mystery* in 1976, with the second and third editions containing further information than the first.
- 2 Benest, Daniel, and Duvent, J. J., 'Is Sirius a Triple Star', *Astronomy and Astrophysics*, Vol. 299, 1995, pp. 621-8. The article was received October 1994 and accepted 8 November 1994.
- 3 Temple, Robert K. G., 'A Response to an Appeal from W. H. McCrea Concerning Sirius', *The Observatory*, Vol. 95, No. 52, 1975.
- 4 Smith, R. C., 'The Book of Job, and Stellar Dynamics', *The Observatory Centenary Celebration Issue*, Vol. 97, No. 1020, October 1977, containing a pink joke section, p. 15P (P for pink).
- 5 Lessing, Doris, *Shukasta*, Jonathan Cape, London, 1979.
- 6 Lessing, Doris, *The Sirius Experiments*, Jonathan Cape, London, 1981.
- 7 West, John Anthony, 'Metaphysics by Design: Harmony and Proportion in Ancient Egypt', *Second Look*, Vol. 1, No. 8, June 1979, pp. 2-5.
- 8 West, John Anthony, *Serpent in the Sky: The High Wisdom of Ancient Egypt*, Wildwood House, London, 1979.
- 9 Ibid., pp. 109-10.
- 10 Ibid., pp. 229-30.
- 11 Ibid., p. 107.
- 12 Schwaller de Lubicz, R. A., *Sacred Science: The King of Pharaohs' Theocracy*, translated by André and Goldiar Vanden Broeck, Inner Traditions International, Rochester, Vermont, U.S.A., 1982, p. 96.
- 13 West, *Serpent in the Sky*, op. cit., p. 202.
- 14 Ibid.
- 15 Ibid., p. 202.
- 16 Ibid.
- 17 Herodotus, translated by A. D. Godley, Loeb Classical Library, Harvard University Press, 4 vols, 1960.
- 18 Ibid., Book II 124, pp. 425-7.
- 19 Ibid., Book II 127, pp. 429-31.
- 20 Ibid., Book II 147, p. 455.
- 21 Ibid., Book II 148-9, pp. 455-9.
- 22 Ibid., Book II 97, p. 385.
- 23 Ibid., p. 455, note 1.
- 24 Ibid., Book II 127, p. 431.
- 25 Harrell, James M., 'The Sphinx Controversy: Another Look at the Geological Evidence', *KMT*, Vol. 5, No. 2, Summer, 1994, p. 72.
- 26 Bauva, Robert, and Gilbert, Adrian, *The Orion Mystery*, Heinemann,



## THE SIRIUS MYSTERY TODAY

London, 1994. Although the idea that the three pyramids represent the three stars of Orion's Belt couldn't be more convenient to me, I have no opinion that there is an alternative theory about the layout of the three pyramids in a manuscript that was sent to me in 1976 (Ruth McCollum, Gerald J. Fraser, and Lamar J. Robinson – none of whom I know or have ever heard of in any other connection – wrote a treatise entitled *The Great Pyramids, The Final Decoding*, dated 1978, and sent a typescript of it to me, one accompanying letter has been misplaced). I have never had time to read it, but I have noticed by scanning through it when going through my old Sirius files in preparation for this new edition, that on p. 31 in Figure 16, a most extraordinary diagram appears, which shows the Fibonacci spiral or Golden Spiral connected with the Lullaby Section, superimposed upon part of the Great Pyramid in such a way that the apices of the three pyramids lie along that curve. (So, that I should mention this, although I have had no opportunity to study the matter owing to shortage of time. I have no idea whether the three authors ever published their work and, I only know from an introductory page that they are American because it is dated from Lincoln, Nebraska. It may well be that these authors did not actually send me their manuscript, but that I was given, by one friend the Argentine physicist Professor Juan Alvarez Lopez, I had wished to join them, some pyramid investigations in the late 1970s, but this never proved possible. I should also add that the builders of the pyramids were so clever that this could be more than one thing simultaneously, and it is quite possible that the three pyramids are laid out on a logarithmic Fibonacci spiral and represent the three stars of Orion's belt. They are not necessarily mutually exclusive. In fact, this is just the sort of intellectual game which the pyramid builders seem to have taken much delight in. The best way to understand the mentality of the pyramid builders is to compare them to a computer genius, whose main joy in life is to construct intricate & elaborate programmes and to leave multi-layered clues, complete with many intellectual jokes.

27 Ibid., pp. 131–2, 172–4, and diagram on p. 174

28 Allen C. W. *Algebra, real Quantities*, 3rd edition. Ashmead Press, London, 1973, p. 228

29 Lang, Kenneth R. *Astrophysical Data: Planets and Stars*, Springer-Verlag, New York et al. 1992, p. 542

30 Ibid.

31 Edwards, I. E. S. *The Pyramids of Egypt* revised edition, Viking, London, 1966 p. 143

32 Ibid. pp. 105–6

33 Harpers, Anne, *The Esoteric Dimension of the Canon: Greek and Latin*

## THE SARIUS MYSTERY

*Source*, University of Nebraska Press, USA, 199. Greek text on pp 146 and 148. English translation on pp. 47 and 149. The text is repeated in the later work by the third century AD Neoplatonist Porphyry (232-301 AD), in his *Commentary on Ptolemy's Harmonics* 1.5. this Greek text is found on pp. 214 and 216, with English translation on pp. 215 and 2.7. The Latin translation of the same passage by Boethius (480-524 AD) in his *De Institutione Musica* 4.1.2. is on p. 256 and the English translation on p. 257. The Greek text of the original work has further comments on pp. 64, 166, 168 and 170, translated into English on pp. 165, 167, 169 and 71 as follows: 'The diapason is less than six tones. For the diapason was proved to be duple, and the tone sesquiquintave. Six sesquiquintave intervals are greater than a duple interval; therefore the diapason is less than six tones. The tone will not be divided into two equal tones nor into more. Therefore, the tone will not be divided into equal intervals.'

34. He merely mentions on p. 24 certain matters relating to the issue from the point of view of the proposition found in the text.
35. *Ibid.* p. 23.
36. *Ibid.* p. 28.
37. Eddington, Sir Arthur. *New Pathway, a Science Messenger Lectures 1934*, Cambridge University Press, 1935, pp. 237, 242.
38. *Ibid.*, pp. 232, 243.
39. Temple, Robert K. G., *The Genius of China [a st. China: Land of Discovery and Invention]*, Simon and Schuster, London and New York, 1986, pp. 209-13.
40. Macrobius, *Commentary on the Dream of Scipio*, Book II Chapter 1 Section 22 translated by William Harris Stahl, Columbia University Press, New York, 1952, p. 189.
41. *Ibid.* footnote 30 gives those references.
42. Thinking along these lines can sometimes bring useful results. For instance, in 1971 or 1972 I noticed that the Earth's diameter exceeded that of the planet Venus by 0.0294 and exceeded that of the planet Mercury by 2.94. The same number thus recurs, differing only by a scaling factor of 100. This cannot be a coincidence. It indicates to me that the Earth, Venus and Mercury – the three inner planets – form what I call the Inner Limb of the Sun. I do not look upon them as bits of rock hurtling round in space, I look upon them as a limb of the Sun. They are united by a specific numerical coefficient, so that their sizes are not arbitrary in their relation to one another. Just as in astronomy the distance of the Earth from the Sun is called an Astronomical Unit (AU), which is simply a computational convenience for us, here we see an actual occurrence of the size of the Earth as another kind of unit – a real.

## THE SIRIUS MYSTERY TODAY

and this time — a unit of reference which acts as a kind of fundamental note in relation in which the two inner planets have formed in sizes which are in demonstrable resonance to it. But, by the operation of a specific numerical coefficient (the innate significance of which requires further investigation), Venus and Mercury have taken on diameters bearing a fixed relationship to the Earth and to each other. This has considerable implications for any theory of planetary formation. But all of this is irrelevant unless you have the key — the actual number. As soon as one knows the number 294 and applies it, one sees the relationships between the three bodies. Otherwise they appear to be random in their size. Of course, I didn't know the number 294, I had to find it by intuitive investigation. And there are certainly other such numbers operative elsewhere in the solar system and I expect they are all related to one another as well. Such discoveries stimulate concealed structures where none was apparent.

43. Temple Robert K. G., *Strange Things*. Sphere Books, London, 1983, sect on entitled 'Are There Two Suns in Our Solar System?', pp 81-83. The suggestions made by several astronomers including Harrison, F. J. Wright of MIT, H. F. Henrichs, R. F. A. Staller, Serge Pinesault and Daniel Williams, combine to say that this star (it exists — which none of them seem to think it does) must have at least one third of the mass of our Sun but cannot be a normal uncollapsed star so therefore must be an almost undetectable neutron star or mini-black hole at a possible distance of one light year from our Sun. The subject arose because F. R. Harrison detected evidence that the centre of gravity of our solar system is being shifted towards a particular region of the sky in the direction of the galactic centre, and affecting the behaviour of six pulsars in that small region of sky by a perturbation. The known mass of our solar system being insufficient to account for this perturbation, the existence of a so far undetected component was suggested to account for it. We may thus live in a binary star system without being aware of it.
44. See for instance p. 13 of Prigogine, Ilya, and Nicolis, Gregoire, *Exploring Complexity*, W. H. Freeman, New York 1989. I tried to get commissioned to write about these subjects from about 1977, but without success.
45. This is analogous to what has been found at the microscopic scale in the Aspect experiment — named after the French physicist Alain Aspect — but this is another very complicated subject in physics which we cannot go into here. I am sorry to plunge so precipitously into it at this physics, in a book which deals with a wholly different subject, but it unexpectedly turned out to be relevant. It is however simply impossible to give full explanations of these things here, for which I offer many apologies.

# THE SIRIUS MYSTERY

- 46 Temple, Robert, *Strange Things*, op. cit. p. 54
- 47 Obviously I cannot in the space available here describe parallel distributed processing, but I have published a hundred pages on the subject in the last chapter of my book *Open to Suggestion*. Aquarian Press, Wellingborough, LK., 1989
- 48 Edwards, op. cit. pp. 105-6
- 49 Ibid., p. 143
- 50 Benest and Duvent, op. cit. p. 625
- 51 Edwards, op. cit., pp. 105-6
- 52 Ibid., p. 152.
- 53 Ibid., p. 143.
- 54 Benest and Duvent, op. cit., p. 625
- 55 Kramer, Samuel Noah. *Sumerian Mythology*, Harper Torchbooks, New York, 1961 p. 57
56. Reported in the *London Daily Telegraph*, December 24, 1979. The original article is Stephenson, D. G. 'Extraterrestrial Cultures within the Solar System' *Quarterly Journal of the Royal Astronomical Society* Vol. 20, No. 4, December, 1979 pp 422-8

## What is the Mystery?

The question which this book poses is: Has Earth in the past been visited by intelligent beings from the region of the star Sirius?

This entire matter of the Sirius mystery first came to my attention around 1965. I was working on some philosophical and scientific problems with Arthur M. Young of Philadelphia, the inventor of the Bell Helicopter and author of many books, most of which were published after *The Sirius Mystery* first appeared (which was in January 1976). In 1972 Arthur was co-editor of and contributor to the fascinating book *Consciousness and Reality*.<sup>1</sup> Arthur's work was so slow to catch on that his other works did not appear until 1976, some months after mine. After many changes of title he decided to call his main work *The Reflexive Universe*.<sup>2</sup> It had once been called, in manuscript, *Quantum Lost, Quantum Regained*, and before that was called *The Universe as Process*. I had worked on it with him under those titles for five years (1962-1966, and from time to time for years after that) and had filled in two or three portions of his grid<sup>3</sup> diagram with him, strangely, he didn't acknowledge my involvement with his central work. Instead, he acknowledged me at the front of his other book of 1976, *The Geometry of Meaning*, with which I had actually been less associated.<sup>4</sup> Arthur's work on the Bell

Hencopfer is recorded in his book *The Bell Notes* <sup>4</sup> When I was a very small child aged three or four there was an incident regarding myself and a helicopter with a kind of glass bubble cockpit on the Hudson River in New York State, and I have always thought it must have been Arthur paying me an early visit on one of his test flights. I was sixteen when I officially met him in 1961, in my first year as an undergraduate student at the University of Pennsylvania.

Arthur single-handedly taught me more science concurrently with my official university studies from 1961-7 than an entire university faculty might have done. For while I was ploughing my way through the Sanskrit language and other onerous subjects at the official university level, I imbibed a considerable scientific education from Arthur in company with a few friends from the university, with whom I participated for years in a series of extremely stimulating seminars and research projects supervised by Arthur Young and occasionally linked to a philanthropic foundation which he had established, entitled the Foundation for the Study of Consciousness.

During 1966 I became the Acting Secretary for this embryonic Foundation, one of its directors was the delightful archaeologist Fro Rainey, who was later to marry my distant cousin Marina, but at that time he hadn't met her yet. Arthur was furious with me for moving to England in October 1966, and for years he kept hoping I would return to live in America again and resume my work with him. He took it as a personal rebuff, although it was of course not intended as anything of the kind. We continued to have massive correspondence, exchanging philosophical ideas, and for a while planning things together. Then he moved to California where he spent half of every year and made new friends and contacts, and although our friendship always remained intact, our contacts became intermittent. It was hard for him when I told him I had had a book accepted for publication, as he had been

unable to achieve this yet for himself. I didn't manage to visit Arthur's Institute for the Study of Consciousness in Berkeley until after he had died. But we saw each other over the years in England and Pennsylvania whenever we could, and the last time I stayed with him was about a year before he died, when he gave me a substantial portion of his enormous library, saying he wouldn't be needing it anymore. My last phone conversation with him was shortly before he died, when he was in too much pain to talk for more than a few sentences. He has many disciples now, and I hope his profound philosophical work will continue to grow and spread as it deserves to do. I don't know many of the new people, and many of the old people whom I did know have died (because I was unusually young when I knew them). But the lead has been taken by Chris Paine, grandson of Arthur's wife Ruth by her previous husband, and the work of the Foundation and Institute are fortunately continuing.

Arthur Young had a particular passion for reading about mythologies from all over the world, including those of obscure tribes. One day he showed me a book entitled *African Worlds*, which contained several chapters, each dealing with a different tribe, with its views of life and its customs and mythology. There was a chapter about the Dogon translated into English from the French of Marcel Griaule and Germaine Dieterlen, the eminent anthropologists.<sup>5</sup>

Arthur pointed out to me a passage he had just read in this chapter, in which these anthropologists were describing the cosmological theories of the Dogon. I shall quote the paragraph which I read then, which first brought to my attention this whole extraordinary question, so that the reader will begin this subject just as I did, with this brief reference:

'The starting-point of creation is the star which revolves round Sirius and is actually named the "*Digitaria* star" it is regarded by the Dogon as the smallest and heaviest of all the

## THE SIRIUS MYSTERY

stars, it contains the germs of all things. Its movement on its own axis and around Sirius upholds all creation in space. We shall see that its orbit determines the calendar.'

That was all. There was no mention by the anthropologists of the actual existence of such a star which revolves around Sirius. Now Arthur Young and I both knew of the existence of the white dwarf star Sirius B which actually does orbit around Sirius. We knew that it was 'the smallest and heaviest' type of star then known. (Neutron stars and 'black holes' were not much discussed and pulsars had not yet even been discovered.) We both naturally agreed that this was a most curious allusion from a supposedly primitive tribe. How could it be explained? I had to let the matter drop, due to other activities and concerns at that time.

Approximately two years later in London, I suddenly was struck by the irresistible urge to investigate this question. I was prompted to do so by reading the rousing futuristic essays of Arthur C. Clarke, whom I had come to know by then. By this time I could not even remember the name of the African tribe, so I wrote to Arthur Young for it. He replied and kindly sent me a photostat of the entire chapter I had seen in *African Worlds*. So, armed with the knowledge that it was a tribe called the Dogon that I was after, I bravely made my way to the Royal Anthropological Institute to see what I could find out about this peculiar tribe.

The librarian went over the catalogue listings with me and I ran into a problem: everything was in French, and I did not know French. However, I persevered and found an article listed which included the word 'Sirius' in its title. That looked promising (for nothing else did). I asked for a photostat. When I picked this up a week or two later (in early November 1967) I was unable to make any sense of it, of course. So I eventually found someone to translate it for me in return for a fee. Finally I was presented with the material in English — and it was quite as rewarding as I could have

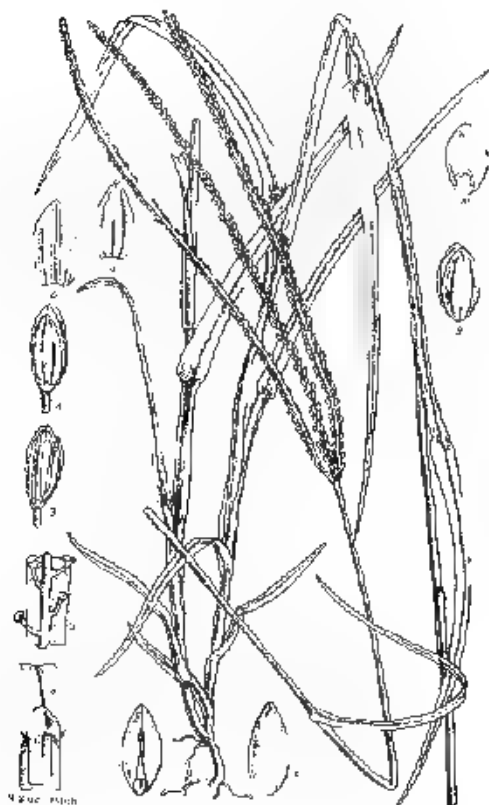


wished.<sup>6</sup> For this article dealt exclusively with the most secret of all the traditions of the Dogon which, after years of living with them, the anthropologists Griaule and Dieterlen had managed to extract from four of their head priests,<sup>7</sup> after a special priestly conference among the tribe and a 'policy decision' to make their secrets known to Marcel Griaule, the first outsider in their history to inspire their confidence.

The most secret traditions of the Dogon all concern the star which the Dogon call after the tiniest seed known to them (see Figure 1), the botanical name for which is *Digitaria*, and which is thus used in the article as the name of the star instead of the actual Dogon name, *pô*.

However, even in this article which deals exclusively with this subject, Griaule and Dieterlen only mention the actual existence of a star which really exists and does what the Dogon say *Digitaria* does, in a passing footnote and in this brief remark. 'The question has not been solved, nor even asked, of how men with no instruments at their disposal could know the movements and certain characteristics of stars which are scarcely visible.' But even in saying this, the anthropologists were indicating their own lack of astronomical expertise, for the star Sirius B which revolves around Sirius, is by no means 'scarcely visible'. It is *totally invisible* and was only discovered in the last century with the use of the telescope. As Arthur Clarke put it to me in a letter of 17 July 1968, after he had suggested he would check the facts: 'By the way, Sirius B is about magnitude 8 - quite invisible even if Sirius A didn't completely obliterate it.' Only in 1970 was a photograph of Sirius B successfully taken by Irving Lindenblad of the US Naval Observatory, this photograph is reproduced in Plate 1.

In the article which I had obtained from the Royal Anthropological Institute, Griaule and Dieterlen recorded that the Dogon said the star *Digitaria* revolved around Sirius every fifty years. It didn't take me long to research Sirius B



*Figure 1* The plant whose botanical Latin name is *Digitaria exilis*. The Dogon call it *fonio*. It is a grass whose seeds are used for food, but it is very localized and grows only in West Africa, it does not occur at all in East Africa. Its seed is so incredibly tiny that one botanist has called it, 'This Lilliputian grain, which is described by Mr Clarke as being about the size of mignonette-seed'.<sup>18</sup> However, despite the minute size of the grain, vast quantities of it are produced for food in the region. In 1976, a botanist reported that

## WHAT IS THE MYSTERY?

721,000 acres of *fonio* were being harvested annually in West Africa in the region 'from Senega. to Lake Chad', and that 'The fonios were extensively harvested as wild cereals before pearl millet was domesticated. They are still frequently grown as encouraged weeds in the fields of other crops, and provide a harvest long before pearl millet or sorghum matures — providing food to over three million people during the most difficult months of the year'.<sup>9</sup> *Fonio* is also called in the region 'hungry rice'. The Dutch botanist Hennisard speaks highly of its flavour. 'It gives a delicious grain for food and Mr [Robert] Clarke<sup>10</sup> is of opinion that if the fundi grain [another name for *fonio* by other tribes than the Dogon] were raised for exportation to Europe, it might prove a valuable addition to the list of light farinaceous articles of food in use among the delicate or convalescent'.<sup>11</sup> H. M. Burkil says of the plant 'Its grain is an extremely important cereal, staple of many tribes. Its origin is lost in antiquity. To the Dogon it is the source of everything in the world. The grain has an agreeable taste and is considered a delicacy. It is normally ground to a flour and eaten as sauce, porridge, or pap, seasoned in various ways. It is easily digested and is fed to babies. The grain is often fermented to produce a beer'.<sup>12</sup>

The reason why *Digitaria exilis* is important for the Sirius mystery is that its tiny seed, probably the world's smallest grain seed, has been chosen by the Dogon as symbolic of the star Sirius B, which being a white dwarf star is the smallest type of star that exists, due to the fact that its matter is 'superdense' — as described in the main text. When in the text we refer to the Digitaria Star of the Dogon, we are referring to Sirius B in the way that they speak of it, as the star symbolized by the tiniest seed known to them. The reason why the Dogon believe that the Digitaria seed is the source of everything in the world is that they believe that all forms of matter were emitted by Sirius B — a possible survival of a concept that matter in the Universe is ejected by exploding supernovae which leave white dwarfs like Sirius B behind as the remnant of the original star.

<sup>9</sup> Mentioned above, the botanist who first recognized this plant in 1842

and discover that its orbital period around Sirius was indeed fifty years. I now knew that I was really on to something. And from that moment I have been immersed in trying to get to the bottom of the mystery.

I have before me a letter from Arthur Young dated 26 March 1968, responding to my initial article called 'The Sirius Question'. He says 'And don't get me into it. I heard about it from one Harry Smith who[m] you met. So the credit should go to him.' I had indeed met Harry Smith at Arthur's house in Philadelphia more than once. Arthur and I often argued about him. I did not warm to him but Arthur liked him and said that he was useful. It was Harry Smith who had given to Arthur a typescript of a translation of Griaule and Dieterlen's book about the Dogon *Le Renard Pale* ('The Pale Fox'), by someone named Mary Beach (of whom I have never otherwise heard, this is not the translation which was eventually published see Bibliography). It was as a result of this that Arthur was able to send it to me, as I could not read the French original. This very copy was then stolen from me by an American associated with the CIA by means of an elaborate ruse and confidence trick of breathtaking audacity: he took me to lunch in London and begged me to loan him the manuscript overnight so that he could photocopy it, and he would give it back to me first thing in the morning. But in the morning I didn't hear from him, so I went to the rented flat where he had been staying. I found the door wide open and the flat entirely empty. I asked a neighbour what had happened, and was told that the man had moved out, and had flown to California at the crack of dawn. I never heard from him again, he had clearly attempted to sabotage my work. I knew he was friendly with a well-known author who lived in America, I phoned that man and complained about the theft and asked if he could help me retrieve the manuscript. He virulently insulted me with a savage tongue-lashing and told me the theft was justified. I was not astonished when I later

## WHAT IS THE MYSTERY?

learned that he had once been employed by the American security services as well. I began to see who some of my enemies were! But this was in the early 1970s. To return to the chronological account:

Arthur C. Clarke was extremely helpful during the next few months. He wrote from Sri Lanka and was fairly often in London, so he and I also discussed at great length many of the mysterious facts from around the world which have since been given such public prominence by the Swiss-German author Erich von Däniken in his best-selling book *Chariots of the Gods* and its sequels. At first I found myself preparing a book on all these exciting mysteries. (No one in the English-speaking world had at that time heard of von Däniken)<sup>12</sup> Arthur Clarke introduced me to one interesting professor after another – each with a pet mystery all his own. Derek Price, Avalon Professor of the History of Science at Yale University, had discovered the true nature of the now famous mechanical computer of approximately 100 BC. found in the Antikythera shipwreck at the turn of the century and unappreciated until it was dropped on the floor in Athens, cracked open and they saw what it was. (See Bibliography under Price.) He also had found traces of Babylonian mathematics in New Guinea and talked a lot about ‘the Raffles shipwreck’.

Then there was Dr Alan McKay, a crystallographer of Birkbeck College at the University of London, who was interested in the Phaistos Disc of Crete, in a mysterious metal alloy found in a Chinese tomb, and in the wilder stretches of the Oxus River. I found that, with people like this around every corner, I was rapidly becoming distracted from my true quest by so many glistening riddles.

I therefore abandoned all those mysteries and determined to concentrate in depth on cracking the one really hard and concrete puzzle that I had been initially confronted with: how did the Dogon know such extraordinary things?

## THE SIRIUS MYSTERY

It is important that this strange material be placed before the public at large. Since learning was freed from the tyranny of the few and opened to the general public, through first the invention of printing and now the modern communications media and the mass proliferation of books and periodicals, then the 'paperback revolution' and now the Internet revolution which is even more explosive, any idea can go forth and plant the necessary seeds in intellects around the world without the mediation of any panel of approval or the filtering of a climate of opinion based on the currently accepted views of a set of obsolescent individual minds.

How difficult it is to keep in mind that this was not always the case. No wonder, then, that before such things were possible, there were secret traditions of priests which were handed down orally for centuries in unbroken chains and carefully guarded lest some censorship overtake them and the message be lost. In the modern age, for the first time secret traditions can be revealed without the danger that they will be extinguished in the process. Can it be that the Dogon came to realize something of this when, through some powerful instinct and after mutual consultations among the highest priests, they decided to take the unprecedented step of making public their highest mysteries? They knew they could trust the French anthropologists, and when Marcel Griaule died in 1956, approximately a quarter of a million tribesmen massed for his funeral in Mali, in tribute to a man whom they revered as a great sage — equivalent to one of their own high priests. Such reverence must indicate an extraordinary man in whom the Dogon could believe implicitly. There is no question but that we are indebted to Marcel Griaule's personal qualities for laying open to us the sacred Dogon traditions. I have now been able to trace these back to ancient Egypt, and they seem to reveal a contact in the distant past between our planet Earth and an advanced race of intelligent beings from another planetary system several light-years

## WHAT IS THE MYSTERY?

away in space. If there is another answer to the Sirius mystery, it may be even more surprising rather than less so. It certainly will not be trivial.

It should not surprise us that there must be other civilizations in our galaxy and throughout the entire universe. Even if the explanation of the Sirius mystery is found to be something entirely different in the years to come, we should bear in mind that the Sirius mystery will have served to help us speculate along proper and necessary lines, and opened our innately lazy minds that much further to the important question of extraterrestrial civilizations which must certainly exist.

At the moment, we are all like fish in a bowl, with only the occasional leap out of the water when our astronauts go aloft. The public long ago became bored with space exploration before it had even really begun properly. We found that Congressmen needed continual injections of 'space rescues' and 'satellite gaps' in their tired bloodstreams, like a heroin fix, in order to stimulate them in their horrible state of lethargy to vote funds for the space programmes which so many of them consider a bore and lacking in excitement and suspense.

The psychological impact of photographs of the Earth from space, a giant and beautiful orb resting on nothing, pearled with clouds and sparkling with sea, has begun to send resonances down the long and sleepy corridors of our largely drugged psyches. Mankind is imperceptibly struggling to the new and undeniable realization that we are all in this game together. We are all perched on a globe suspended in what appears to be emptiness, we are made up of atoms which are mostly themselves emptiness, and above all, we are the only really intelligent creatures directly known to us. In short, we are alone with each other, with all the fratricidal implications of such a tense situation. Now the Mars explorations promise to bring us to our senses and reawaken our sense of awe and

wonder regarding space – and not a minute too soon. At last we are exploring another planet, albeit by remote control, and the future can begin.

But at the same time as we are all slowly realizing these things – the inevitable conclusion which follows upon all this is beginning to make some headway with us as well. It has begun to occur to more than a handful of exceptional people (exceptionally intelligent or exceptionally insane) that if we are sitting here on this planet fighting among ourselves for lack of any better distraction, then perhaps there are lots of planets all over the universe where intelligent beings are either sitting and stewing in their own juice as we are, or where those beings have broken out of the shell and established contact with other intelligent beings on other planets. And if this is really going on all over the universe, then perhaps it will not be all that long before we find ourselves linked up with our fellows elsewhere – creatures living beside another star out in that vast emptiness which spawns planets, suns and moons.

For years I have thought that those organizations which spend millions of dollars on 'peace' and attempts to find out what is wrong with human nature that it should indulge in so perverse a thing as conflict, would be better advised to donate their entire treasures to the space programmes, and to astronomical research. Instead of seminars for 'peace research' we should build more telescopes. The answer to the question: 'Is mankind perverse?' will be known when we can compare ourselves with other intelligent species and evaluate ourselves according to some scale other than one which we fabricate out of the air. At the moment we are shadow-boxing, chasing phantoms. The answers lie out there somewhere with other stars and other races of beings. We can only compound our neuroses by becoming even more introspective and narcissistic. We must look outward. At the same time, of course, we must look back relentlessly into our own past. To go for-



## WHAT IS THE MYSTERY?

ward with no conception of where we have been makes no sense whatsoever. There is also the probability that we may discover mysteries about our own origins. For instance, one result of my research, which began harmlessly with an African tribe, has been to demonstrate the possibility that civilization as we know it was an importation from another seat in the first place. The linked cultures of Egypt and Sumer in the Mediterranean area simply came out of nowhere. That is not to say that there were no people alive before that. We know there were lots of people, but we have found no traces of high civilization. And people and civilization are vastly different things. Take for instance these words by the late Professor W. B. Emery from his book *Archaic Egypt*:

At a period approximately 3,400 years before Christ, a great change took place in Egypt, and the country passed rapidly from a state of advanced neolithic culture with a complex tribal character to two well organized monarchies, one comprising the Delta area and the other the Nile valley proper. At the same time the art of writing appears, monumental architecture and the arts and crafts developed to an astonishing degree, and all the evidence points to the existence of a well-organized and even luxurious civilization. All this was achieved within a comparatively short period of time, for there appears to be little or no background to these fundamental developments in writing and architecture.

Now, whether or not one supposes that there was an invasion of advanced people into Egypt who brought their culture with them, the fact remains that when we get back to that period of history we are faced with so many imponderables that we can hardly say anything for certain. What we do know is that primitive people suddenly found themselves living in

## THE SIRIUS MYSTERY

thriving and opulent civilizations and it all happened rather abruptly. In the light of the evidence connected with the Sirius question, as well as other evidence which has either been dealt with by other authors or remains to be tackled in the future, it must be entertained as a serious possibility that civilization on this planet owes something to a visit by advanced extraterrestrial beings. It is not necessary to postulate flying saucers, or even gods in space suits. My own feeling is that this matter has not been dealt with in a sophisticated enough manner so far. But rather than enter into mere speculation as to what extraterrestrials landed in, etc., let us move on to the evidence that at least indicates that they might have been here. In Part Three we shall consider some details and clues that the extraterrestrial visitors from Sirius, whom I postulate, may have been amphibious creatures with the need to live in a watery environment. But all this gets into the speculative areas which are such treacherous ground. It has always been my policy, as well as my temperamental inclination, to stick to solid facts. We shall see as we proceed just how solid the facts are, and that is a strange enough tale for the moment. As usual, truth has proved itself stranger than fiction. The reader is advised to read Part Three of this book for some 'wild speculation'.

The book which now follows poses a question. It does not present, but merely suggests, an answer. In Part One the question is posed in its original form, and in Part Two it is rephrased. But nowhere is it answered with any certainty. The best questions are the ones which often remain unanswered for a long time and lead us down new avenues of thought and experience. Who knows where the Sirius mystery will lead us in the end? But let us follow it for a while. At the very least it will be an adventure.

## WHAT IS THE MYSTERY?

### Notes

1. Muses, Charles and Young, Arthur M. eds. *Consciousness and Reality*. Outerbridge & Lazard. New York 1972. Arthur inscribed this to me: 'To Bob, Who went 'through the door'
2. Young, Arthur M., *The Reflexive Universe: Evolution of Consciousness*. Delacorte Press and Robert Briggs Associates, San Francisco, 1976. Arthur inscribed this book to my (future) wife and myself 'with fond memories of past discussions and anticipation of more'
3. Young, Arthur M., *The Geometry of Meaning*, Delacorte Press and Robert Briggs Associates, San Francisco, 1976. Arthur inscribed this one 'To Bob Temple Whom I believe, must be one of these beings from Outer Space'
4. Young, Arthur M., *The Bell Notes: A Journey from Physics to Metaphysics*, Robert Briggs Associates, Mill Valley, California, 1979
5. *African Worlds*, ed. Daryll Forde. Oxford University Press, 1954, pp. 83-110. I wish to point out to the reader that in the article in *African Worlds*, the French word *arche* is mistranslated 'arch' and should instead be rendered 'ark'
6. The translation was, it turned out, extremely inept. The article has been entirely retranslated by a professional translator for inclusion in this book. It has also been vetted by Mme Germaine Dieterlen herself, who has kindly given permission for the publication in English of the entire article written by herself and Marcel Griaule, as Appendix I.
7. Photographs of these four tribal priests are reproduced on the colour plates. I thought it particularly important that these original native informants be seen by the reader. Apart from the fact that their faces are extremely interesting, we owe these four people a great deal. Without them the public at large might never have known anything about the Sinus mystery, and the entire tradition might, after its thousands of years on earth, actually have sunk without trace.
8. Stapf O. Ibura and Fundi. Two Cereals of Upper Guinea, in *Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew*, London, No. 8, 1915, p. 383.
9. de Wet, J. M. J., 'The Three Phases of Cereal Domestication', in Chapman G. P. ed. *Grain Evolution and Domestication*. Cambridge University Press, UK, 1992, p. 183.
10. Heurard. J. Th. *Monograph of the Genus Digitaria*, University of London Press, London Netherlands 1950, p. 238.  
Burk. H. M. *The Useful Plants of West Tropical Africa*, Edition 2, Vol. 2, Royal Botanic Gardens, Kew UK, 1994, pp. 245-7.
11. Ulrich von Däniken entered into correspondence with me on 22 April

## THE SIRIUS MYSTERY

1976, after reading my book. He wrote to me saying: "With great enthusiasm I have read your book *The Sirius Mystery*. I should like to congratulate you for this masterpiece! One thing that among scientific circles is hardly known is the fact, that already way back in 1959, 60/64 and 65 I have written several articles on the subject [of extraterrestrial visitation] which were published in various newspapers (for your information I am enclosing a copy of such an old article). He enclosed a photostat of an article by him in German, published in 1964. My original statement that nobody had heard of von Däniken at this stage is therefore misleading, for in the German-speaking world he was already writing about extraterrestrial visitations for newspapers.

PART ONE

*The Sirius Question  
is posed*



## CHAPTER TWO

# The Knowledge of the Dogon

If you look up at the sky, the brightest star you can see is Sirius. Venus and Jupiter are often brighter but they are not stars; they are planets going round our own sun, which is a star itself. Now no astronomer will tell you there is any particular reason for intelligent life to be in the area of Sirius. The reason Sirius is so bright is that it is large and close, bigger than the sun and bigger than the handful of other nearby stars. But an intelligent astronomer will tell you that perhaps the stars Tau Ceti or Epsilon Eridani, which are rather similar to our sun, have planets with intelligent life. It would be a good guess. But among the stars most frequently discussed as possibly harbouring intelligent life Sirius is not included. It is not a particularly 'obvious' choice.

Project Ozma in the spring of 1960, and, in more recent years, other radio searches for intelligent life in space, listened for meaningful signals from the stars Tau Ceti and Epsilon Eridani. But none were detected. Not that that proves anything but that these two nearby stars were thought by some sensible astronomers to be possible locations of intelligent life in our neighbourhood of space. Project Ozma only listened to these two stars to see if any signals were coming from them on a certain wavelength at a certain time with a lot of energy behind them. Nothing happened. Later

such attempts have more realistically widened their scope somewhat, but the astronomers are fully aware that they are waltzing in the dark, and their efforts really take on the nature of a gesture which can only be described as bravado in the face of enormous odds. They cannot be certain that they are going about the task in the right way, but are doing what they hope is their best. Since Project Ozma, the giant radio telescope at Arecibo in Puerto Rico, which is the largest in the world, has listened selectively to several stars — but not to Sirius. It is the author's hope that the evidence presented in this book will be sufficient to stimulate an astronomical investigation of the Sirius system more thorough than all those to date, and build on the studies by Irving Lindenblad.<sup>2</sup> I also believe that a programme should be instituted at a major radio telescope to listen to the Sirius system for indications of any possible intelligent signals.

Now the basis of speculations about intelligent life in space is always going to include the possibility that contact with life on our planet has already been made by some more highly evolved society from elsewhere in the universe.<sup>3</sup> It is the possibility that our planet has had contact with a culture apparently from the area of Sirius that this book will discuss. There seems to be substantial evidence that at some relatively recent time in the past — possibly between 7,000 and 10,000 years ago — this may have happened, and any other interpretation of the evidence would not seem to make enough sense.

Before we come to the evidence, I should say a little more about Sirius. About the middle of the last century an astronomer was looking rather hard at Sirius over a period of time and got annoyed because it wasn't sitting still.<sup>4</sup> It was wobbling. He had a difficult time figuring this out, but he finally concluded that an extremely heavy and massive star going around Sirius could make it wobble that way. The only trouble was that there wasn't any large star going around Sirius! Instead there turned out to be a tiny little thing going



around it every fifty years, and so Sirius came to be called Sirius A and the little thing became Sirius B.

Sirius B was at that time unique in the universe as far as anyone knew. Over a hundred of these things have now been actually seen scattered around the sky and there are many thousands more which we cannot see even through our modern telescopes because they are so tiny and their light so feeble. They are called white dwarfs.<sup>5</sup>

White dwarfs are strange because although they are feeble they are strong. They do not give out much light, but they are fantastically powerful gravitationally. On a white dwarf we would not even be a fraction of an inch high. We would be flat, pulled in by the gravity. A cubic foot of the matter of Sirius B would weigh 2,000 tons. A match-box full of matter from the star would weigh a ton and a quarter. But a match-box full taken from the star's core would weigh approximately fifty tons. The star is 65,000 times denser than water, whereas our own Sun has a density about equal to that of water. The 'big' star that was necessary to make Sirius A wobble turned out to be a little thing, but it still had to be as massive and heavy as an ordinary star of much more enormous size. It is, in short, a star so dense and closely packed that it is not even made out of regular matter. It is made out of what is called 'degenerate' matter or 'superdense' matter, where the atoms are pressed together and the electrons squashed. This matter is so heavy that it cannot be thought of in any familiar terms. There is nothing in our solar system, to our knowledge, comparable to this stuff. But physicists have considered it theoretically, and in this century we are making some progress towards understanding it.

It was even claimed by some astronomers that the Sirius system has a Sirius C, or a third star. Fox claimed to see it in 1920, and in 1926, 1928 and 1929 it was supposedly seen by van den Bos, Finsen, and others at the Union Observatory. But then for several years when it should have been seen, it

## THE SIRIUS MYSTERY

was not. Zagar and Voigt said it was there because there were wobbles that pointed to it.<sup>6</sup> And as we saw in Chapter One, Benest and Duvent in 1995 confirmed the existence of the third star.

An extensive study of the Sirius system by an astronomer was carried out by Irving W. Lindenblad of the US Naval Observatory in Washington, DC. He and I corresponded, and he sent me his publications (the latest appeared in 1973) and also the photograph in Plate I, which was taken by him in 1970 after several years' preparation and is the first photograph ever taken of the star Sirius B, which in the photograph is a tiny spot of light near the main star Sirius A, which is 10,000 times brighter.

Lindenblad's accomplishment in getting a successful photograph is described in 'Notes to the Plates'. He studied the Sirius system for seven years and found no evidence of a third star, Sirius C. He says,<sup>7</sup> 'There is no astrometric evidence, therefore, of a close companion to either Sirius A or Sirius B'. Another astronomer, D. Latterborn, persisted in believing — correctly as we now know — that there is a third star in the Sirius system.<sup>8</sup>

Now we see that the Sirius system is rather interesting and complicated. Only in this century have we advanced towards knowing about degenerate matter and understanding white dwarfs through our researches into nuclear physics. So we would be surprised, would we not, if someone without our modern science had known as much about the Sirius system as we do?

At this point I want to quote from *Intelligent Life in the Universe* by Carl Sagan and I. S. Shklovski. In a very sensible chapter called 'Possible Consequences of Direct Contact' Sagan says:<sup>9</sup>

[Matters of human evolution], while difficult for us to reconstruct from a distance of millions of years, would

## THE KNOWLEDGE OF THE DOGON

have been much clearer to a technical civilization greatly in advance of the present one on Earth, which visited us every hundred thousand years or so to see if anything of interest was happening lately. Some 25 million years ago, a Galactic survey ship on a routine visit to the third planet of a relatively common G dwarf star [our Sun] may have noted an interesting and promising evolutionary development Proconsul [the ancestor of *homo sapiens*, or modern man]. The information would have filtered at the speed of light slowly through the Galaxy, and a notation would have been made in some central information repository, perhaps at the Galactic center. If the emergence of intelligent life on a planet is of general scientific or other interest to the Galactic civilizations, it is reasonable that with the emergence of Proconsul, the rate of sampling of our planet should have increased, perhaps to once every ten thousand years. At the beginning of the most recent post-glacial epoch, the development of social structure, art, religion, and elementary technical skills should have increased the contact still further. But if the interval between sampling is only several thousand years, there is then a possibility that contact with an extraterrestrial civilization has occurred within historical times.

This is a very interesting prelude to our own story, and I believe Sagan and Shklovsky's attitude is broadly true of the entire astronomical profession. It must be a very dull and pessimistic astronomer indeed who seriously doubts that there must be countless numbers of intelligent civilizations scattered throughout the universe on other planets which are orbiting around other stars.<sup>10</sup> An attitude which asserts that man is the only intelligent life form in the universe is intolerably arrogant today, though in, say, 1950 it was probably common belief. But anyone who holds such an

opinion today is, fortunately for those who like to see some progress in human conceptions, something of an intellectual freak equivalent to a believer in the Flat Earth Theory

Dr Melvin Calvin, of the Department of Chemistry, University of California at Berkeley, has said 'There are at least 100,000,000 planets in the visible universe which were, or are, very much like the earth — this would mean certainly that we are not alone in the universe. Since man's existence on the earth occupies but an instant of cosmic time, surely intelligent life has progressed far beyond our level on some of these 100,000,000 planets.'<sup>1</sup>

Dr Su-Shu Huang of the Goddard Space Flight Center, Maryland, has written: '... planets are formed around the main-sequence stars of spectral types later than F5. Thus, planets are formed just where life has the highest chance to flourish. Based on this view we can predict that nearly all single stars of the main sequence below F5 and perhaps above K5 have a fair chance of supporting life on their planets. Since they compose a few per cent of all stars, life should indeed be a common phenomenon in the universe.'<sup>2</sup>

Dr A. G. W. Cameron, Professor of Astronomy at Yeshiva University, has discussed the stars Tau Ceti and Epsilon Eridani, which are considered the two likeliest localities for intelligent life within our immediate neighbourhood of space (within five 'parsecs' of us, a parsec being an astronomical unit of distance). He has then said, however 'But there are about 26 other single stars of smaller mass within this distance, each of which should have a comparable probability of having a life-supporting planet according to the present analysis'<sup>3</sup>

Dr R. N. Bracewell of the Radio Astronomy Institute, Stanford University, has said '<sup>4</sup>

As there are about one billion stars in our galaxy, the number of planets would be about 10 billion. Now not

## THE KNOWLEDGE OF THE DOGON

all of these would be habitable, some would be too hot and some too cold, depending on their distance from their central star; so that on the whole we need only pay attention to planets situated as our earth is with respect to the sun. Let's describe such a situation as being within the habitable zone.

This is not to imply that no life would be found outside the habitable zone. There may very well be living things existing under most arduous physical conditions.

After elimination of frozen planets and planets sterilized by heat, we estimate that there are about  $10^{10}$  [ten thousand million] likely planets in the galaxy [for life]. Of the  $10^{10}$  likely planets, we frankly do not know how many of them support intelligent life. Therefore, we explore all possibilities, beginning with the possibility that intelligent life is abundant and in fact occurs on practically every planet. In this case, the average distance from one intelligent community to the next is 10 light years. For comparison, the nearest star, of any kind, is about 1 light year away.

Ten light-years is a very large distance. A radio signal would take 10 years to cover the distance. Consequently, communicating with someone 10 light years away would not be like a telephone conversation. Are we sure that we can send a radio signal as far as 10 light years? A definite answer can be given to this question.

There is no need for me to continue marshalling quotations from distinguished scientists and astronomers in support of the possibility of intelligent life in space, as the situation is by now obvious. The odds against intelligent life occurring fairly frequently within our galaxy are impossible ones. Since this is established, we are faced with yet another factor: in our own history, technological development has been rapid within a short space of time. It is familiar to older members of

our species today that when they were young there were no airplanes, automobiles, rockets, satellites, electricity, radio, atom bombs, computers or Internet. People were dying of diseases which today we do not take seriously, no one with a toothache could obtain modern dental treatment, the concept of elementary hygiene was a novelty. I am not reciting all these wonders merely as a ritual incantation to our new god of progress. The point to be grasped is the sudden combustible nature of progress of this kind. In the lifetime of a single person all this can come about.

'Take-off point' is probably a universal phenomenon. Intelligent societies all over the universe will probably have experienced it, or are due to. Now the lifetime of a single person is of no consequence on the great universal time scale for the development of civilizations, not to mention the formation of planets. Therefore any society in advance of our own is certain to be very much in advance of ours. Once intelligent societies reach take-off point, they rush so quickly upward in technological competence that a comparison between them and non-technological societies is almost absurd. It would be foolish for us to suppose that any society more advanced than ours would be just a few years ahead of us. It would more likely be just a few tens of thousands of years ahead of us. And the technology and nature of such a society are beyond our abilities to imagine. The intelligent societies existing in the universe, then, are going to be of two kinds: less advanced than ourselves, 'primitive', and fantastically more advanced than ourselves, 'magical'. To be at the point where we are now, at the watershed between 'primitive' and 'magical' is such a rare event in the universal history, that we may be the only intelligent society in the entire galaxy which is at this moment experiencing such a stage in our evolution. We therefore should feel privileged to be witnesses of it. Of course, the nature of time comes in again with the impossibility of talking sensibly about

simultaneity in the galaxy at all. But that is another subject, and one which we may ignore here.

A further thought follows upon the above observations. Granted that there are two forms of society in the universe aside from our own bizarre transition stage: the 'primitive' societies are obviously only of interest to those more advanced than themselves, for they are incapable of communicating with anybody else. They are like we were as little as a hundred years ago: provincial, quiet, probably quite murderous, and smug, with the occasional visionary who is burned at the stake or crucified causing a moral ripple. But they cannot send or receive messages between the stars. In our transition stage, aptly enough, we can receive such messages with existing equipment, but could not send any unless we constructed expensive and special means to do so. Now that means that the only societies carrying on an interstellar dialogue of any kind are the 'magical' societies. These societies will be so advanced that they probably have emerging primitives like ourselves 'taped'. They certainly have standard sets of procedures for dealing with the likes of us, and may already have commenced their operations with the long range intent of bringing us into their club. But just as no London gentlemen's club wishes to have a savage in a g-string waving his spear and poisoned arrows about in the members' lounge, so the interstellar club is unlikely to plug us straight into the circuits as a fully-fledged member.

But what I am getting at is not merely to impress upon the reader that a pecking order is likely to exist in the interstellar club of any galaxy, at least to the extent of having restrictions on novices, but to make the point which emerges from this. And the point is, that such highly advanced societies have possibly developed to such a pitch of technological expertise that interstellar travel has become possible for them, whereby they can physically transport themselves over at least modest interstellar distances of a few light-years to their near

neighbours. And if that is the case, then our own planet, which any half-witted extraterrestrial astronomer in the neighbourhood could assume as a likely place for life to exist, has almost certainly been physically visited by extraterrestrials in their travels. This could have happened at any time in our lengthy history as a planet. No doubt, at the very least, our distant ancestors the cave-men would have been observed by extraterrestrial probes, who would have made a note that something was happening on this planet - slowly happening, but nevertheless actually happening. And as Sagan and Shklovski said in the quotation from their book: 'It is reasonable that the rate of sampling of our planet should have increased, perhaps to once every ten thousand years. But if the interval between sampling is only several thousand years, there is then a possibility that contact with an extraterrestrial civilization has occurred within historical times.'<sup>15</sup>

If this were so, it would certainly have left some impact upon man and been incorporated somehow into his traditions. But if several thousand years had elapsed between that time and the present, the traces of the impact on man's culture would have been mostly dissipated and, it would seem, nearly impossible to elucidate. Unless some specific and unmistakable survivals were found to exist, in circumstances which would probably be unusual, it seems that the hope of reconstructing scattered clues and fragments of the original tradition would be futile. That there would be something there if you could find the key seems certain. Let us return to a continuation of that passage from Sagan and Shklovski for suggestions as to how a memory of an extraterrestrial contact might have been preserved from prehistoric or early historic times on Earth, through comparison with a verifiable story of French contact made with certain American Indians in 1786, as it was told to a modern anthropologist in the form of a tribal myth:<sup>16</sup>



## THE KNOWLEDGE OF THE DOGON

There are no reliable reports of direct contact with an extraterrestrial civilization during the last few centuries, when critical scholarship and non-superstitious reasoning have been fairly widespread. Any earlier contact story must be encumbered with some degree of fanciful embellishment, due simply to the views prevailing at the time of the contact. The extent to which subsequent variation and embellishment alters the basic fabric of the account varies with time and circumstances. [An example] relevant to the topic at hand is the native account of the first contact with the Tlingit people of the northeast coast of North America with European civilization — an expedition led by the French navigator, La Perouse in 1786. The Tlingit kept no written records, one century after the contact, the verbal narrative of the encounter was related to the American anthropologist G. T. Edmons by a principal Tlingit chief. The story was overlaid with the mythological framework in which the French sailing vessels were initially interpreted. But what is very striking is that the true nature of the encounter had been faithfully preserved. One blind old warrior had mastered his fears at the time of the encounter, had boarded one of the French ships, and exchanged goods with the Europeans. Despite his blindness, he reasoned that the occupants of the vessels were men. His interpretation led to active trade between the expedition of La Perouse and the Tlingit. The oral rendition contained sufficient information for later reconstruction of the true nature of the encounter, although many of the incidents were disguised in a mythological framework — for example, the ships were described as immense black birds with white wings.

As another example, the people of sub-Saharan Africa, who had no written language until the colonial period, preserved their history primarily through

## THE SIRIUS MYSTERY

folklore. Such legends and myths, handed down by illiterate people from generation to generation, are in general of great historical value.

I don't know why the people of sub-Saharan Africa — with whom our initial evidence deals — are mentioned at this point in the Sagan book, for they do not crop up again in this chapter and it is something of a coincidence that they are mentioned out of the blue like this. Sagan goes on to discuss some fascinating creatures credited with founding the Sumerian civilization (which sprang up out of nowhere, as many Sumerian archaeologists will unhappily admit). They are described in a classical account by Alexander Polyhistor\* as amphibious. He says they were happier if they could go back to the sea at night and return to dry land in the daytime. All the accounts describe them as being semi-demons, personages, or animals endowed with reason, but they are never called gods. They were 'superhuman' in knowledge and length of life and they eventually returned in a ship 'to the gods' carrying with them representatives of the fauna of the earth. I discuss these traditions particularly in Chapter Nine, and the surviving accounts of them are to be found in Appendix III, reprinted here in their entirety for the first time since 1876.

The Sumerian culture is very important. We shall be discussing it later in this book. It formed the original basis of that Mesopotamian civilization which is better known to most people through the much later Babylonians and Assyrians who inherited much of the Sumerian culture. The actual language of the Sumerians was superseded rather early by the Akkadian language (which is Semitic, Sumerian is non-Semitic and seems to have no linguistic affinities at all). The

\* Born circa 105 B.C. at Miletus, lived at Rome and wrote more than fifty volumes of history, Pythagorean lore, etc. — all lost but for a few fragments.

Akkadians and the Sumerians intermingled and eventually formed a meld like that which now exists between what once were the separate Normans and Anglo-Saxons in Britain, except that the Akkadians were Semitic and the Sumerians were not, and with considerable physical differences between them. Then the city of Babylon with its Babylonians and the region of Assyria with its Assyrian warriors to the north and later the distant region of Fars with its Persians to the east commanded the Mesopotamian area. From the Sumerian-Akkadian milieu also evolved those Semites known as Hebrews or Jews.

It should be more widely realized that when those famous Biblical figures Noah and Abraham 'lived' there was no such thing as a Hebrew yet in existence. Indeed, Noah is merely a Hebrew name for a much more ancient flood hero discussed in ancient texts which we have now recovered from early Sumer.<sup>7</sup> It is these Sumerians to whom Sagan has just referred, with their legend of an amphibious creature who founded their civilization. But all this does not concern us quite yet. I will just add that the Jews and the Arabs are both traditionally said to be descendants of Abraham, and Abraham was neither a Jew nor an Arab.

Now the peoples of sub-Saharan Africa are the source of our first arresting information. The particular people are called the Dogon, and they live in the present state of Mali. The nearest cities to them are Timbuctoo\* (see Figure 2), Bamako, and Ouagadougou in Burkina (formerly Upper Volta). Initial research by me on the Dogon turned up an article in an anthropological journal by the French anthropologists Marcel Griaule and Germaine Dieterlen entitled 'A Sudanese Sirius System'.<sup>8</sup> The article was written in French and an English translation of it is published as Appendix I of this book. I decided to publish the article in

\* Frequently written now as Tombouctou.

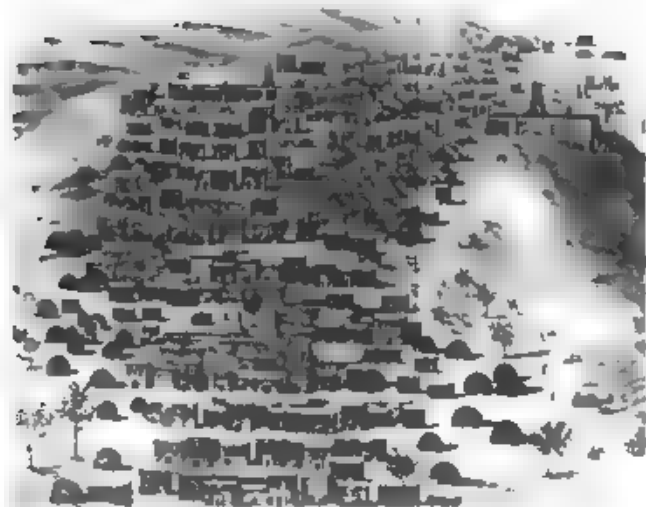


Figure 2 A view of Timbuktu in 1830 — the first time it was seen by the Western public. Published as the frontispiece to René Caillié's *Travels through Central Africa to Timbuktu, and Across the Great Desert, to Morocco. Performed in the Years 1824-1828*, 2 vols, London, 1830. Caillié was the first Western explorer to reach this fabled and remote city, of which he wrote: 'The city of Timbuktu forms a sort of triangle, measuring about three miles in circuit' (Vol. II, p. 56.) The large building is the Great Mosque. Caillié did not penetrate as far as to meet the Dogon, but he encountered the Bambara Tribe and wrote of them: 'I scarcely ever saw so gay a people as the Bambaras. At sunset they assemble under the great bombaces, at the entrance of the village, and dance all night to music which is not unpleasant — their dispositions are gentle and humane' (Vol. I, p. 369).

full because of the difficulty most interested readers would find in locating the French journal in which the original article appeared. And, of course, the original article could only be read by those who know French. The complete

# THE KNOWLEDGE OF THE DOGON

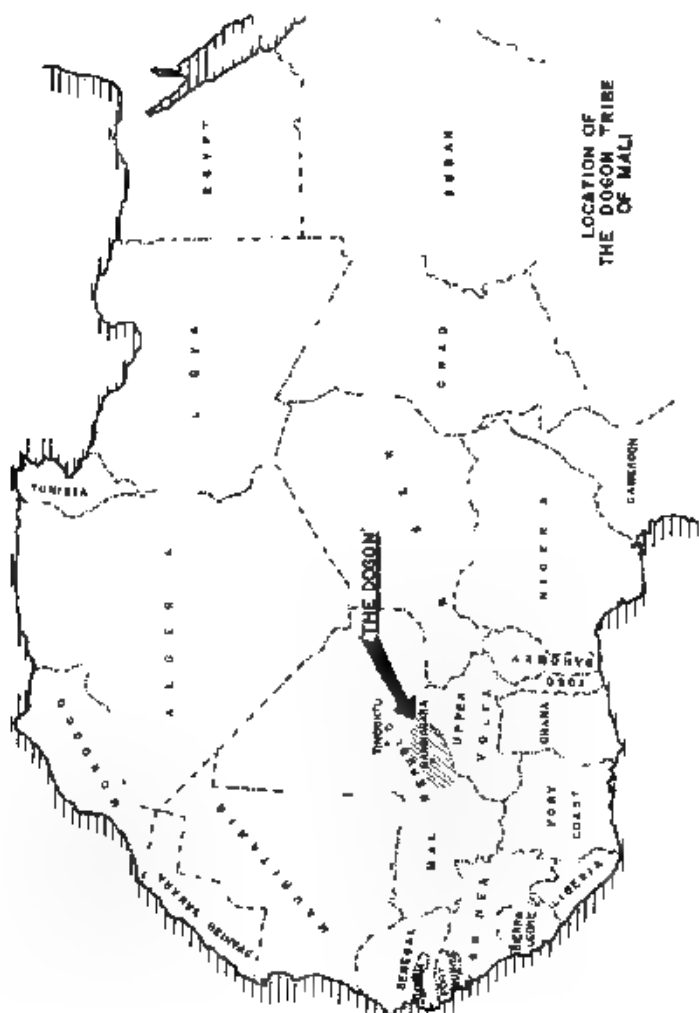


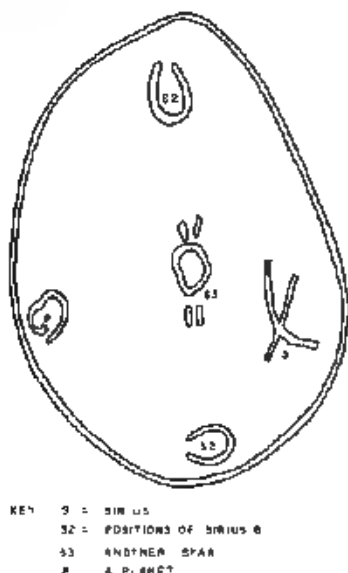
Figure 3.

## THE SIRIUS MYSTERY

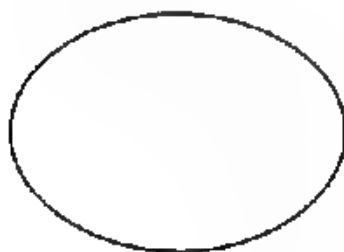
article, with its footnotes and all its illustrations, and in English, is therefore available for anyone who wishes to read it for himself. It is thus not necessary for me to summarize its contents.

When I first read the article (which refers to the French Sudan area, not the Republic of Sudan over a thousand miles to the east below Egypt), I could hardly believe what I saw. For here was an anthropological report of four tribes, the Dogon and three related ones, who held as their most secret religious tradition a body of knowledge concerning the system of the star Sirius, including specific information about that star system which it should be impossible for any primitive tribe to know.

The Dogon consider that the most important star in the sky is Sirius B, which cannot be seen. They admit that it is



*Figure 4*



## AN ELLIPSE

Figure 5

invisible. How, then, do they know it exists? Griaule and Dieterlen say 'The problem of knowing how, with no instruments at their disposal, men could know the movements and certain characteristics of virtually invisible stars has not been settled, nor even posed.' But even in saying this, Griaule and Dieterlen imply that Sirius B is only 'virtually invisible', whereas we know it is totally invisible except through a powerful telescope. What, then, is the answer?

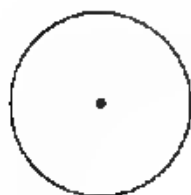
Griaule and Dieterlen make clear that the large and bright star of Sirius is not as important to the Dogon as the tiny Sirius B, which the Dogon call *pô tolo* (*tolo* meaning 'star'). *Pô* is a cereal grain commonly called 'fonio' in West Africa, and whose official botanical name is *Digitaria exilis*. In speaking of the *pô* star, Griaule and Dieterlen call it 'the star Digitaria', or just simply 'Digitaria'. What is significant about the *pô* grain is that it is the smallest grain known to the Dogon, being extremely minute, and unknown as food in Europe or America. To the Dogon, this tiny grain represents the tiny star, and that is why the star is called *pô*, after the grain. In the article we read, 'Sirius, however, is not the basis of the system. it is one of the foci of the orbit of a tiny star called Digitaria, *pô tolo* . . . which . . . hogs the attention of

male initiates. Now, this is a most unsettling statement. The casual reader may not notice just how unusual it is for an African tribe to put it quite this way. But the orbit of *Digitaria*, which the Dogon elsewhere describe as egg-shaped or elliptical (see also Figures 8 and 9, as well as the illustrations to the article in Appendix I), is specifically described as having the main star Sirius as 'one of the foci of [its] orbit'. Of course the technical term 'focus' has here been supplied by the anthropologists. But they were faithfully rendering the meaning of what the Dogon said in their own language. And what the Dogon were saying, and which they also make quite clear graphically in their drawings (see Figures 4 and 8), is that the orbit of Sirius B around Sirius A is of a kind which obeys one of Kepler's laws of planetary motion, extended to other orbiting bodies. It was Johannes Kepler (1571-1630) who first proposed that heavenly bodies do not move in perfect circular paths. He hit upon the brilliant insight that the planets in their motions around the sun were moving in elliptically shaped orbits, with the sun at one of the two foci of each ellipse. Most people I speak to have no idea that the planets don't go in circles around the sun. Even if they were taught the truth at school, they have long since forgotten about things like that. And many people honestly don't know what an ellipse is unless you show them one.

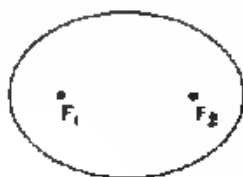
An ellipse is a kind of 'stretched' circle. You can conceive of grabbing the centre of a circle and ripping the centre into two pieces, and then pulling those two portions away from each other. This would naturally make the circle flatten at the top and the bottom and bulge at the two sides, and the two pieces of the centre would fall along a straight line joining the two most distant points. These two fragments of centre each then have the name of *focus*, and the two together are 'the foci of the ellipse'. If you could get your hands on that ellipse and push at the bulging ends, you might force it back together again and make it a proper circle.



## THE KNOWLEDGE OF THE DOGON



CIRCLE, ONE CENTRE



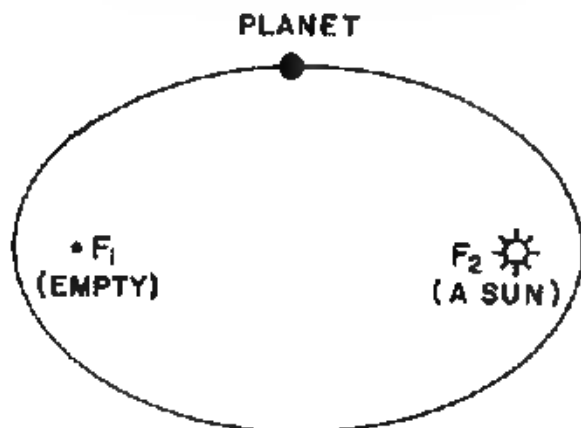
ELLIPSE, TWO FOC

*Figure 6*

But what I ask all readers to take note of is this. How did the Dogon tribe, who had no access to the theories of Kepler or his successors, know about matters like this? Although Kepler lived in the sixteenth century, we shall see that other information possessed by the Dogon originated in the West only in the late 1920s. There were no Western missionaries to the Dogon prior to Griaule and Dieterlen first visiting them in 1931. The White Fathers, the French missionary order, have confirmed this to me in correspondence. The transmission of Western knowledge to the Dogon seems to be an impossibility. How did they even get the idea in the first place that elliptical orbits existed, rather than circular — much less apply this idea to some invisible star way out in space? And also to get it right by saying that Sirius A was at one of the foci, rather than just somewhere in the ellipse? And not at the centre? Wouldn't the natural primitive idea seem to be, even if you wanted to say the orbit was elliptical, still to have Sirius itself at the centre? But no. They knew too much to make a mistake like that. For the whole point about Kepler's Law is that not only are the orbits ellipses, but the sun must always be at one of the foci, otherwise nothing will work. Now, in order to know about all this, you need not have had Kepler. Elliptical orbits are a universal truth, as true here as they are

## THE SIRIUS MYSTERY

on the other side of the galaxy, or even in some other galaxy. Kepler merely discovered a natural principle. So there was no need for the Dogon to know about Kepler personally. All that is required is an explanation of how they could have learned the universal principle from any other source.



*Figure 7*

In Figure 8, I compare the Dogon drawings of the orbit of Sirius B around Sirius with the modern astronomical diagrams of the same (which have been confirmed as accurate at this scale by Lindenblad's work); also there is a comparison of the same information, tribal and modern, as seen in a linear perspective, stretched through time. I do not need to claim any perfect scientific accuracy for the Dogon drawings. The similarity is so striking that the most untrained eye can immediately see that the general picture is identical, in each instance. There is no need for perfectionists to get out their calculators or measuring tapes. The fact is demonstrated, and it is that the Dogon have an accurate general knowledge of the

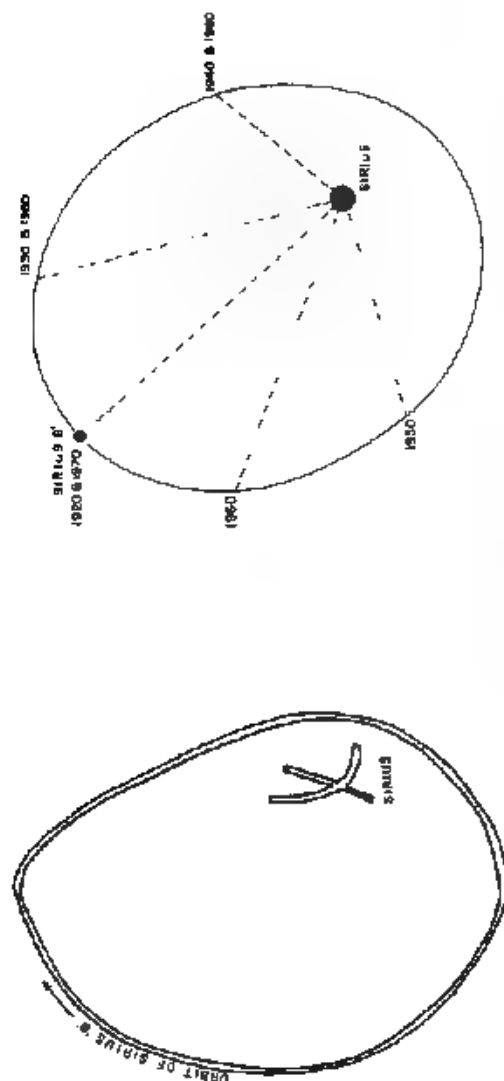


Figure 8. On left: the orbit of Dig.tania (Sirius B) around Sirius as portrayed by the Dogon in their sand drawings. On right: A modern astronomical diagram of the orbit of Sirius, the years indicated being the positions of Sirius B in its orbit on those dates. Note that the Dogon do not place Sirius at the centre of their drawing but seem to place it near one focus of their approximate ellipse – which constitutes one of the most extraordinary features of their information, and matches the diagram on the right to an uncanny degree.

most unobvious and subtle principles of the orbiting of Sirius B around Sirius A

The Dogon also know the actual orbital period of this invisible star, which is fifty years. Referring to the sacred *Sigui* ceremony of the tribe, Dieterlen and Griaille tell us. 'The period of the orbit is counted double, that is, one hundred years, because the *Siguis* are convened in pairs of "twins", so as to insist on the principle of twin-ness'

The Dogon also say that Sirius B rotates on its axis, demonstrating that they know a star can do such a thing. In reality, all stars really do rotate on their axes. How do the Dogon know such an extraordinary fact? In the article, the Dogon are recorded as saying 'As well as its movement in space, *Digitaria* also revolves upon itself over the period of one year and this revolution is honoured during the celebration of the *bado* rite'. The Dogon believe the day of the *bado* is when a beam of rays carrying important signals strikes the Earth from Sirius B. It is not known to modern astronomy what the period of rotation of Sirius B is, the star is so small we think we are doing well to see it at all. I asked one astronomer, G. Wegner, then of Oxford's Department of Astrophysics and the University Observatory, whether one year might be a sensible estimate of the rotation period of Sirius B. He naturally replied that we had no way of determining it, but that a year could be right, in other words, it cannot be ruled out, which was all I was seeking to establish.

The Dogon describe Sirius B as 'the infinitely tiny'. As we know, Sirius B is a white dwarf and the tiniest form of visible star in the universe. But what is really the most amazing of all the Dogon statements is this. 'The star which is considered to be the smallest thing in the sky is also the heaviest. "*Digitaria* is the smallest thing there is. It is the heaviest star." It consists of a metal called *sagala* which is a little brighter than iron and so heavy "that all earthly beings

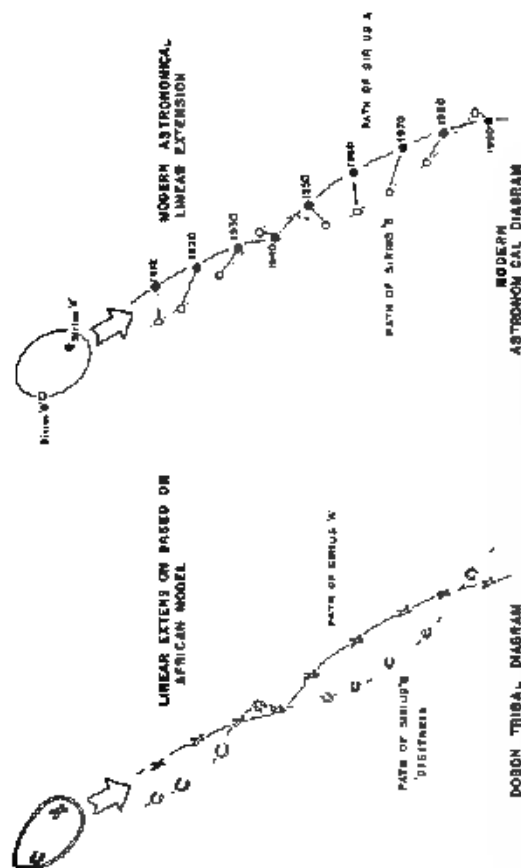


Figure 9 The linear extension on the right is scientifically reliable, based on measurements of the rate of revolution of Sirius B around Sirius A. The linear extension on the left is *not* scientifically reliable. It is a presumed correlation, for there is no way in which the rate of revolution of Digitaria can be known certainly from the Dogon information. These linear extensions cannot, therefore, be considered to constitute hard evidence of a correlation. It is likely, though, that they do correlate because Digitaria is presumed to move at a rate which makes astronomical sense (for if the shape of the orbit and the distance match, the period should match).

## THE SIRIUS MYSTERY

combined cannot lift it" In effect the star weighs the equivalent of all the seeds, or of all the iron on the earth ' (all this from the article by Griaule and Dieterlen which is Appendix I of this book ).

So we see the Dogon presenting a theory of Sirius B which fits all known scientific facts, and even some which are not known it presents as well

All this forms the most sacred and most secret tradition known to the Dogon, the basis of their religion and of their lives Connected with all this are statements they make about the existence of a third star in the Sirius system, which they call the *emme ya* ('Sorghum - female') star which, in comparing it to Denebata, they say is 'four times as light (in weight), and travels along a greater trajectory in the same direction and in the same time as it (fifty years) Their respective positions are such that the angle of their radii is at right angles.' This last star has a satellite, indicating that the Dogon appreciate that bodies other than stars are satellites of stars Of *emme ya* itself, they say 'It is "the sun of women"

"a little sun" In fact it is accompanied by a satellite which is called the "star of women" or Goatherd as

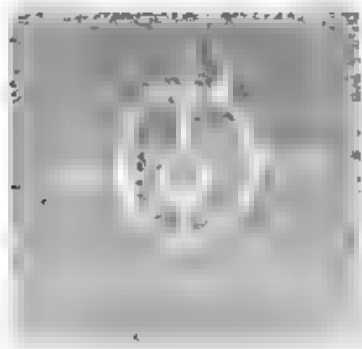


Figure 10 Dogon drawing of a planet going round Sirius C. *Emme ya*

the guide of *emme ya*. It is the third star, *emme ya*, 'Sorgum Female', or the sun of women which is the Sirius C which in 1995 was confirmed by the astronomers, as described in Chapter One.

Around the astronomical facts of this extraordinary system, the Dogon have a complicated system of mythology. Sirius B they see as 'relentlessly revolving around Sirius and never capable of reaching it'. All these facts have mythological tales and personages connected with them. I have tried to extract the bare facts from the article and present them here for the reader. But the reader will by now see quite clearly why I have included the entire article in this book, for the information is so incredible that I thought the reader would simply think I had made it all up unless I presented the source for him to read through himself.

But let us move beyond the Griaule and Dieterlen article 'A Sudanese Sirius System' and consider a later and fuller publication of book length, which is obviously too bulky to include within this book as an appendix. I refer to the book *Le Renard pâle* (The Pale Fox) published in 1965.\* This book, by Griaule and Dieterlen, was produced ten years after the death of Marcel Griaule himself. It contains Mme Dieterlen's latest reflections on the Sirius system of the Dogon. In this definitive compendium<sup>19</sup> of much of the joint findings of herself and Marcel Griaule (it is only the first such volume of theirs to appear in a planned series summing up their work), Mme Dieterlen has actually added a brief appendix on pages 529-31 which gives information about Sirius and its companion star in the form of an extract from an article by Dr P. Baize which appeared in the September 1931 issue of *Astronomie*. She says, 'The excerpts concern the discovery, orbit, period and density of the Companion of Sirius'.<sup>20</sup> Her

\* The fox of the Dogon (*\*k'urugu*) is *Vulpes pallidus* (see Plate 2), not the fox found in Hérault, which is *Vulpes vulpes*.

curiosity has obviously developed since 1950 and the publication of 'A Sudanese Sirius System'. But like a true professional, Mme Dieterlen merely cites the astronomical facts in this way in a short appendix at the back of her book<sup>21</sup> without drawing any conclusions or even indicating the connection of this subject with the Dogon traditions. In fact, lest the reader assume otherwise, I must make clear that neither Marcel Griaule nor Mme Dieterlen has at any time (to my knowledge) made any claim of extraterrestrial contact to do with the Dogon. They have not even made any direct comments on the extraordinary impossibility of the Dogon knowing all the things which they know. I could never have made discoveries such as those of Griaule and Dieterlen and merely said (as in the article): 'The problem of knowing how

has not been settled, nor even posed'. I do believe such restraint calls for a medal, it is so phenomenal that it is the greatest factor in favour of Griaule and Dieterlen's discoveries. If they had trumpeted their findings, I suppose I would never have taken them seriously. I would have thought them unreliable. Such are the ironies by which information can be revealed – by almost disappearing through diffidence.

I sat down and rewrote this book in the light of *Le Renard pâle* (I read the translation in manuscript<sup>22</sup>), with its more complete information. Much of this will be found in the context of a more advanced discussion in Chapter Nine.

In *Le Renard pâle* it is possible to learn much more of the Dogon beliefs and knowledge relating to astronomy and the Sirius system. Of the moon, they say it is 'dry and dead like dry dead blood'<sup>22</sup>. Their drawing of the planet Saturn has a ring around it and is reproduced as Figure 12 in this book. They know that the planets revolve around the sun. Planets are called *tolo tanaze*, 'stars that turn (around something)'<sup>23</sup>.

<sup>21</sup> Subsequently an English translation has appeared – by Stephen C. Intendant, published by the Continuum Foundation, Chino Valley, Arizona, USA, in 1986. It has no index.



But this does not mean turning around the Earth. The Dogon specifically say, for instance 'Jupiter follows Venus by turning slowly around the sun'<sup>23</sup> The various positions of Venus are recalled on a very large geographical space by a series of altars, raised stones, or arrangements in caves or shelters.<sup>25</sup> The positions of Venus determine a Venus calendar.<sup>26</sup> In fact, the Dogon have four different kinds of calendar. Three of them are liturgical calendars: a solar calendar, a Venus calendar, and a Sirius calendar. Their fourth is an agrarian one, and is lunar.<sup>27</sup>

The Dogon know of the existence of four other invisible heavenly bodies besides Sirius B and its possible companions in the Sirius system. These other four bodies are in our own solar system. For the Dogon know of the four major 'Galilean' moons of Jupiter. These four moons are called 'Galilean' because Galileo discovered them when he began to use the telescope in the autumn of 1609. The other moons of Jupiter are small and insignificant, having formerly been asteroids which were captured by Jupiter's gravitation at some unknown time in the past. (They are thought to have come from the asteroid belt between Mars and Jupiter which some astronomers think once constituted a planet which exploded.) The Dogon say 'The mutilation the Fox [identified with the troublesome Ogo; see account of him which follows] suffered was still bloody. The blood of his genitals fell on the ground, but Amma made it ascend to heaven as four satellites that turn around *dana tolo*, Jupiter,

"The four little stars are Jupiter wedges" When Jupiter is represented by a rock, it is wedged in with four stones.<sup>28</sup> A Dogon drawing of Jupiter with its four moons is reproduced as Figure 11. Griaule and Dieterlen describe this drawing as follows:<sup>29</sup>

This figure represents the planet — the circle surrounded by its four satellites in the collateral

directions and called *dana toto unum* 'children of *dana toto* (Jupiter)' The four satellites, associated to the four varieties of *sene* (acacia), sprang from the drops of blood from the Fox's mutilated genitals. 'The four small stars are Jupiter's hulls' The sectors between the satellites represent the seasons. They turn around Jupiter and their movements wil. favour the growth of the *sene* leaves, for the *sene* moves on the ground at night like the stars in the sky, they turn on their own axes (in a year) like the satellites.

Figure 11 Dogon drawing of Jupiter with its four main moons

They add in a footnote that 'the trunks of certain varieties of *sene* are spiralled. A house is not built with *sene* wood, which would make the house "turn" The "movements" of the *sene* at night are supposed to attract the souls of the dead who "change place" '

As for Saturn, drawn in Figure 12, the Dogon specifically describe its famous halo, which is only visible through a telescope According to Griaule and Dieterlen<sup>30</sup> 'the Dogon affirm there is a permanent halo around the star, different from the one sometimes seen around the moon the star is always associated to the Milky Way '

Saturn is known as<sup>31</sup> 'the star of limiting the place' in asso-

## THE KNOWLEDGE OF THE DOGON

ciation somehow with the Milky Way. The meaning is unclear, and Gervase and Dosterien on the subject must be pursued further,<sup>12</sup> but it would seem they may be trying to convey the idea that Saturn 'limits the place' of the solar system, separating it from and as ting as link with, the Milky Way itself, in which the solar system is situated. Saturn being the outermost planet which the Dogon mention, this may be their intended meaning. The Dogon realise that the Milky Way contains the Earth.<sup>13</sup> The Milky Way is in itself the image of the spiralling stars inside the "world of spiralling stars" in which the Earth is found. In this "world of stars", the axis ("Amma's fork") around which they move, links the Polar Star and so on. The Milky Way is described as the 'more distant stars' that is, then the planets.

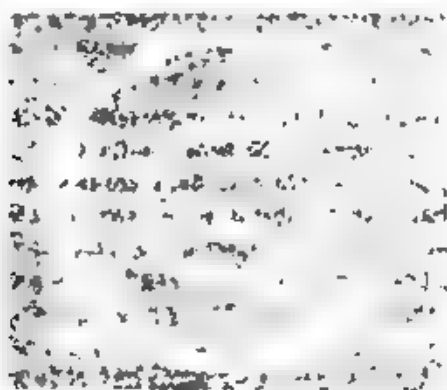


Figure 12. Saturn with its ring. Dogon drawing

We are told that<sup>14</sup> 'For the Dogon an infinite number of stars and spiralling worlds exist'. They carefully differentiate the three kinds of *tole* or 'stars'. The fixed stars are a part of the "family of stars that doesn't turn" (around another star) the planets belong to the "family of stars that turns"

around another star, the satellites are called *tolo gonoxe* "stars that make the circle" <sup>35</sup> The heavenly motions are likened to the circulation of the blood. The planets and satellites and companions are 'circulating blood' <sup>36</sup> And this brings us to the extraordinary point that the Dogon do know about the circulation of the blood in the body from their own tradition. In our own culture, the Englishman William Harvey (1578-1657) discovered the circulation of the blood. Strange as it may seem to us now, before his time the notion seems not to have occurred to anyone in the Western world. John Aubrey, author of *Brief Lives*, knew Harvey well and tells us <sup>37</sup> 'I have heard him say, that after his *Booke of the Circulation of the Blood* came out, that 'twas beleev'd by the vulgar that he was crack-brained'. However, the same theory does not seem to arouse among the Dogon notions that their wise men are crack-brained. Here is an account of the Dogon theory recorded in their own words <sup>38</sup>

The movement of the blood in the body which circulates inside the organs in the belly, on the one hand 'clear' blood, and on the other the oil, keeps them both united (the words in man): that is the progress of the word. The blood-water or clear goes through the heart, then the lungs, the liver and the spleen, the oily blood goes through the pancreas, the kidneys, the intestines and the genitals.

*Postscript (1997)* It was the Chinese who first discovered the circulation of the blood, although this remained unknown in the West until 1546, when Michael Servetus mentioned it (he, Giordano Bruno and two others actually preceded Harvey). The circulation of the blood is clearly described in the Chinese medical classic, *The Yellow Emperor's Manual of Corporeal Medicine*, in the second century BC, and the theory is believed to have been formulated in China no later than the sixth century BC. But this knowledge seems to have been

confined to China for two millennia, and can hardly have reached West Africa. I published an account of this in my book on the history of Chinese science in 1986 (Temple, Robert K. G. *The Genius of China* (original title in the UK: *China. Land of Discovery and Invention*, Patrick Stephens, Welingtonborough, 1986), Simon and Schuster, New York, 1986, and Prion Books, London, 1991, pp. 123-4).

The Dogon say '... the food you eat, the beverage you drink, that Amma changes into red blood; white blood is a bad thing' <sup>39</sup> They also say 'The essence of nourishment passes into the blood' <sup>40</sup> They know that the blood passes into the internal organs 'starting with the heart' <sup>41</sup> The Dogon even seem to understand the role of oxygen - or at least, air - entering the bloodstream. For they equate air with 'the word' which they say enters the bloodstream bringing 'nourishment of the interior' by 'the impulse raised by the heart'. The 'integration of the "word" (air) into the body also has to do with the food nourishing the blood. All the organs of respiration and digestion are associated with this integration.' <sup>42</sup>

The Milky Way, likened as I said to a circulation of the blood, is described further '... the term *yaku ulo* designates the Milky Way of our galaxy, which sums up the stellar world of which the Earth is a part, and which spins in a spiral. . . (it encompasses) the multiplication and the development, almost infinite, of the spiraloid stellar worlds that Amma created. . . (there are, spiraling worlds that fill the universe

infinite and yet measurable' <sup>43</sup> Amma is the chief god, the creator, of the universe, to the Dogon. There is an interesting account of Amma and the creation. 'The active role of fermentation at the time of the creation is recalled in the present brewing of beer. . . the fermentation of the liquid constitutes a "resurrection" of the cereals destroyed in the brewing.

Life . . . is comparable to a fermentation. "Many things were fermenting inside Amma" at the creation' <sup>44</sup> And

'Spinning and dancing, Amma created all the spiralling worlds of the stars of the universe' <sup>45</sup> 'Amma's work realized the universe progressively, it was made up of several stellar worlds spiralling around.' <sup>46</sup>

The Dogon have no difficulty in conceiving of intelligent life all over the universe. They say, <sup>47</sup>

The worlds of spiralling stars were populated universes, for as he created things, Amma gave the world its shape and its movement and created living creatures. There are creatures living on other 'Earths' as well as on our own, this proliferation of life is illustrated by an explanation of the myth, in which it is said, man is on the 4th earth, but on the 3rd there are 'men with horns' *innetu gammariugu*, on the 5th, 'men with tails' *innetu dultogu*, on the 6th, 'men with wings' *innetu bummo* [An ancient Dogon iron state of one of these 'men with wings' from the 'Sixth Earth' may be seen in Plate 9], etc. This emphasizes the ignorance of what life is on the other worlds but also the certainty that it exists.

The Dogon know that the Earth turns on its own axis. The standard way of foretelling the future for the Dogon is to draw a pattern in the sand before going to bed, and in the morning to look and see where in that pattern the fox has stopped during the night. This indicates events to come. When the fox walks over the tables of divination which have been drawn in the sand, 'the planet begins to turn under the action of (the fox's) paws' <sup>48</sup> 'When the only traces that are visible are made by the tail, the image is likened to the movement of the Earth turning on its own axis; it is said, "The Fox turned with his tail, the Earth turned on its own axis" <sup>49</sup> 'So the divination table represents the Earth "which turns because of the action of the Fox's paws" as he moves along the registers, while the instruction table represents the space in which the Earth moves, as well as the sun and the

moon, which were placed by Amma out of his reach.<sup>50</sup> The instruction table here referred to has twelve registers and constitutes a lunar calendar, with each register representing a month. It is Figure 96 in *Le Renard pâle*. These twelve months, then, are 'the space in which the Earth moves' that is, one year's orbit around the sun. And within this orbit, the Earth's rotations on its own axis every day take place. The orbit around the sun is 'the Earth's space'.

The Dogon know perfectly well that it is the turning of the Earth on its axis which makes the sky seem to turn round. They speak of 'the apparent movement of the stars from east to west, as men see them'.<sup>51</sup> The Dogon are thus free from the illusions of our European ancestors, who thought the sky and stars wheeled round the Earth (though there was an exception to such primitive notions in Europe which no historian of science has ever reported, at least as far as I have been able to discover after a great deal of searching. I have summarized this 'secret' tradition in Appendix II and pointed out its connection with the Sirius mystery.)

The placenta is used by the Dogon as a symbol of a 'system' of a group of stars or planets. Our own solar system seems to be referred to as 'Ogo's placenta',<sup>52</sup> whereas the system of the star Sirius and its companion star and satellites, etc., is referred to as 'Nommo's placenta'.<sup>53</sup> Nommo is the collective name for the great culture hero and founder of civilization who came from the Sirius system to set up society on the Earth. Nommo - or, to be more precise, the Nommos - were amphibious creatures, and are to be seen in the two tribal drawings in Figure 52 and Figure 54 in this book.

Here is the way in which Graule and Dieterlen record the Dogon beliefs about the two cosmic placentas I have just mentioned.<sup>54</sup>

Two systems, that are sometimes linked together, intervene, and are at the origin of various calendars,

giving a rhythm to the life and activities of man. . . One of them, nearest to the Earth, will have the sun as an axis, the sun is the testament to the rest of Ogo's placenta, and another, further away, Sirius, testament to the placenta of the Nommo, monitor of the Universe

The movements of the bodies within these 'placentas' are likened to the circulation of blood in the actual placenta, and the bodies in space are likened to coagulations of blood into lumps. This principle is also applied to larger systems. 'In the formation of the stars, we recall that the "path of the blood" is represented by the Milky Way',<sup>55</sup> 'the planets and satellites (and companions) are associated to the circulating blood and to the "seeds" that flow with the blood'.<sup>56</sup> The system of Sirius, which is known as 'land of the fish',<sup>57</sup> and is the placenta of Nommo, is specifically called the 'double placenta in the sky',<sup>58</sup> referring to the fact that it is a binary star system. The 'earth' which is in the Sirius system is 'pure earth', whereas the 'earth' which is in our solar system is 'impure earth'.<sup>59</sup>

The landing of Nommo on our Earth is called 'the day of the fish',<sup>60</sup> and the planet he came from in the Sirius system is known as the '(pure) earth of the day of the fish' not (our) impure earth'.<sup>61</sup> In our own solar system all the planets emerged from the placenta of our sun. This is said of the planet Jupiter,<sup>62</sup> which 'emerged from the blood which fell on the placenta'. The planet Venus was also formed from blood which fell on the placenta.<sup>63</sup> (Venus 'was blood red when she was created, her colour fading progressively'.<sup>64</sup>) Mars, too, was created from a coagulation of 'blood'.<sup>65</sup> Our solar system is, as we have noted, called the placenta of Ogo, the Fox, who is impure. Our own planet Earth is, significantly, 'the place where Ogo's umbilical cord was attached to his placenta' and recalls his first descent'.<sup>66</sup> In other words, the Earth is where Ogo 'plugged in', as it were,



to this system of planets. What Ogo the Fox seems to represent is man himself an imperfect intelligent species who 'descended' or originated on this planet, which is the planet in our solar system to which the great umbilical cord is attached. Ogo is representative of ourselves, in all our cosmic impurity. It comes as a shock to realize that we are Ogo, the imperfect, the meddler, the outcast. Ogo rebelled at his creation and remained unfinished. He is the equivalent of Lucifer in our own tradition in the Christian West. And in order to atone for our impurity it is said over and over by the Dogon that the Nommo dies and is resurrected acting as a sacrifice for us, to purify and cleanse the Earth. The parallels with Christ are extraordinary, even extending to Nommo being crucified on a tree, and forming a eucharistic meal for humanity and then being resurrected.

We are told that the Nommo will come again. A certain 'star' in the sky will appear once more<sup>67</sup> and will be the 'testament to the Nommo's resurrection'. When the Nommo originally landed on Earth, he 'crushed the Fox, thus marking his future domination over the Earth which the Fox had made'<sup>68</sup>. So perhaps man's brutish nature has already been sufficiently subdued in our distant past. Perhaps it was those visitors whom the Dogon call the Nommos who really did 'crush the Fox' in us, who all but destroyed Ogo, and have given us all the best elements of civilization which we possess. We remain as a curious mixture of the brute and the civilized, struggling against the Ogo within us.

The Dogon comment further on the heavenly motions. '... the Earth turns on its own axis ... and makes a great circle (around the Sun) ... The moon turns like a conical spiral around the earth. The Sun distributes light in space and on the earth with its rays.'<sup>69</sup> The sun is 'the remainder of Ogo's placenta'<sup>70</sup> and the centre of our system. For some reason, which they say is the visitation to earth of the amphibious bringers of civilization from there, the Dogon

centre their life and religion not on our own solar and planetary system, but on the system of a nearby star and its invisible companions. Why? Can it really be for the reason they say? And if so, will the Nommo come again? We should really investigate the details of the Dogon knowledge as fully as possible. In *Le Renard pâle*, as opposed to the earlier article reproduced here, it is said, for instance, that the star *emme ya* in the system of Sirius may have an orbital period of thirty-two years instead of the fifty years which others maintain. It is larger than Sirius B and 'four times lighter'. In relation to Sirius B, 'Their positions are straight'. It is watched over by Sirius B and acts as an intermediary, transmitting Sirius B's 'orders'.<sup>71</sup> We now know that such a body exists. The Dogon prognostications could thus act as evidence to be tested. Dr Lindenblad could not find evidence of a Sirius C of the kind which was presumed earlier by astronomers. But evidence has now been found of the kind of Sirius C suggested by the Dogon. And such a discovery having been made, it conclusively establishes the validity of the Dogon claims. The Dogon information about the actual orbit of Sirius C is very confused and incoherent, apparently contradictory.

Among the Dogon, an allusion to the great Creator's immortality and stability is expressed in good wishes of greetings or farewell that are addressed to a friend or relative. 'May the immortal Amma keep you seated'.<sup>72</sup> It is just as well that we keep our seats, for we are about to launch into the dark waters of our planet's past, which may bring quite an alteration of our normal conceptions of it. For it is not only that a culture contact between ourselves and an alien civilization from outer space may have taken place, of which we shall find more evidence from our own ancient cultures, we shall also discover that the ancient world, the further back one goes in time, tends to develop a more and more odd flavour. The mysteries become denser, the strangeness thicker and more viscous. Just as in tracing the origins of

sugar one goes from lighter syrup back to the thick and pungent molasses which develops, it seems, qualities far removed from one's expectations at the beginning, so with the past. Its doors encrusted with almost solid cobwebs give off the stench of air last breathed by ancestors forgotten by us all.

## Notes

1. Cameron, A. G. W., ed., *Interstellar Communication*. W. A. Benjamin, Inc. New York, 1963. See p. 75 (Calvin), p. 88 (Huang), p. 110 (Cameron), and particularly p. 176 (Drake).
2. For account see *Sky and Telescope*, June, 1973, p. 354. Publications: Lindenblad, Irving, 'Relative Photographic Positions and Magnitude Difference of the Components of Sirius' in *Astronomical Journal*, 75, No. 7 (September 1970), pp. 841-8, and 'Multiplicity of the Sirius System' in *Astronomical Journal*, 78, No. 2 (March, 1973), pp. 205-7.
3. Sagan, C. and Shklovskii, I. S. *Intelligent Life in the Universe*, Doubleday Publishing Co., New York, 1966, pp. 437, 440-64.
4. The astronomer Johann Friedrich Bessel in 1834. Just before his death in 1844 he decided Sirius must be a binary system. In 1862 the American Alvan Clark looked through the largest telescope then existing and saw a faint point of light where Sirius B should be, confirming its existence. In 1915 Dr W. S. Adams of Mt Wilson Observatory made the necessary observations to learn the temperature of Sirius B, which is 8000°, half as much again as our sun's. It then began to be realized that Sirius B was an intensely hot star which radiated three to four times more heat and light per square foot than our sun. It then became possible to calculate the size of Sirius B, which is only three times the radius of the Earth, yet its mass was just a little less than that of our sun. A theory of white dwarfs then developed to account for Sirius B, and other white dwarfs were later discovered.
5. See previous note.
6. Aitken, R. G., *The Binary Stars*, Dover Publications, New York, 1964, pp. 240-1. The account of Sirius extends from p. 237 to p. 241.
7. 'Multiplicity of the Sirius System,' art. cit. (see above, Note 2).
8. *Mass Loss and Evolution in Close Binaries*, Copenhagen University, 1970, pp. 190-4. A seminar held in Elsinore Castle, with Lauterborn as a participant.
9. Op. cit. (Note 3 above) Chapter 33.

## THE SIRIUS MYSTERY

0. See for instance the book *Interstellar Communication*, op. cit. (Note 1 above), an anthology with contributions from nineteen astronomers and scientists
1. Ibid., p. 75
12. Ibid., p. 92
13. Ibid., p. 110
14. Ibid. pp. 232-5
15. Op. cit. (Note 3 above) pp. 440-64
16. Ibid.
17. See for instance Pritchard, J. B., *Ancient Near Eastern Texts relating to the Old Testament*. Princeton University Press, 1955. p. 42. the introductory remarks to trans. of 'The Deluge' and also pp. 93-5, account of the Flood
18. Griaule, M. and Dieterlen, G., 'Un Système Soudanais de Sirius' *Journal de la Société des Africanistes*. Tome XX. Fascicule 2, 1950. pp. 273-94. An English translation of this article is Appendix I of his book
19. Griaule, Marcel, and Dieterlen, Germaine, *Le Renard pâle* (Tome I, Fascicule 1), Institut d'Ethnologie, Musée de l'Homme, Palais de Chaillot, Place du Trocadéro, Paris 16<sup>e</sup> (75016 Paris), 1965, 544 pp.
- Ibid. p. 529
21. Nine references are given to Hauze's publications, extending to 1938, and one given to Schatzman in *L'Astronomie*, 195h. pp. 364-9
22. *Le Renard pâle*. p. 478.
23. Ibid. pp. 480-1
24. Ibid.. pp. 480-1
25. Ibid.. p. 486.
26. Ibid. p. 48
27. Ibid. p. 226.
- Ibid. p. 264
29. Ibid., p. 329.
30. Ibid.. p. 292.
31. Ibid. p. 291.
32. Ibid. p. 292
33. Ibid. p. 32
34. Ibid. p. 32
35. Ibid. p. 323.
36. Ibid. p. 323
37. Aubrey, J., *Brief Lives*, Penguin, London, 1972. See entry for Harvey, William, pp. 290-1
38. *Le Renard pâle* p. 348
- Ibid. p. 287 r. 1
40. Ibid. p. 4

# THE KNOWLEDGE OF THE DOGON

- 41 Ibid., p. 141.
- 42 Ibid. p. 141.
- 43 Ibid., pp. 102-4.
- 44 Ibid., p. 128.
- 45 Ibid., p. 163.
- 46 Ibid., p. 168.
- 47 Ibid. p. 170 n. 2.
- 48 Ibid., p. 276.
- 49 Ibid. p. 279, inc. n. 4.
- 50 Ibid., p. 280.
- 51 Ibid. p. 335.
- 52 Ibid. p. 470.
- 53 Ibid. p. 470.
- 54 Ibid., p. 470.
- 55 Ibid., p. 489.
- 56 Ibid., p. 323.
- 57 Ibid., p. 384.
- 58 Ibid., p. 384.
- 59 Ibid., p. 381.
- 60 Ibid., p. 381.
- 6 Ibid., p. 381.
- 62 Ibid., p. 287.
- 63 Ibid., p. 248.
- 64 Ibid., pp. 248-9.
- 65 Ibid., p. 249.
- 66 Ibid., p. 219.
- 67 Ibid., p. 440.
- 68 Ibid., p. 440.
- 69 Ibid., p. 477.
- 70 Ibid., p. 477.
- 7 Ibid., p. 475.
- 72 Ibid., p. 499 n. 2.



## PART TWO

# *The Sirius Question is Rephrased*

## INTRODUCTION

We shall turn now to the star Sirius in history. What was its importance, if any, in ancient religions? Is there evidence from the ancient cultures that the mysterious details of the Sirius system were known to others than the Dogon tribe? And can we discover where the Dogon got their information?

I must warn the reader that Part Two is difficult, by the nature of its subject matter. I have tried to make it readable, but beg the reader's indulgence if I have not succeeded. It is exciting material and the reader should stick with it. I am certain he will come out at the end of the tunnel with a great deal of amazement. For the ancient cultures are far more bizarre than the ordinary person is generally led to expect.





## CHAPTER THREE

### A Fairytale

Once there was a beautiful bright star named Sothis, as fine as any goddess. She had long held a dominant position in the sky and been admired by all for her beauty. But of late she had felt unwell, indeed, it distinctly seemed to her that she felt her life ebbing away. Night by night she fell further from her high, proud place in the sky – closer to the sky-line and what must surely be her certain death. Failing, failing, she clung to any companion star she could find, only to discover that they too felt this deathly weakness, and were sinking into a kind of sweet sleep. What was she to do? She felt her strength going nightly; she could hardly shine the way she wished. Once she had been as glamorous as scintillating a queen of the night sky as ever had been seen. And now she felt she was as worthless as any old woman, her position at the centre of things gone, and her beauty fading steadily. Towards the end she wept bitterly and her eyes reddened with the shame of her coming eclipse. She was so ill, her discomfort so acute. She was almost glad to welcome her fate and that terrible line of earth and hills which she had dreaded, at last devoured her brilliant presence entirely. The night came and she was no more. Beneath the earth she rested in the balm of death.

But because this queen of the sky had been good during her ascendancy and had not been too haughty or vulgar, there

were many admirers of her beauty to mourn her passing. Down on the lowly earth moved less brilliant mortals. Many nights they had stood in awe of the beautiful Sothis when she was in her prime. Some, indeed, had watched her birth when, red as a baby from the womb or as the Sun when he rises daily, this bright and beautiful immortal (or so she had seemed) had first flashed the most piercing and glittering rays of her incomparable presence sideways across the earth – seeming almost to scorch the very ground with her flaming beauty. This first appearance had been brief, for immediately behind her had come the all-engrossing grandeur of the great Sun himself. Heedless of Sothis, he soon washed the sky white with his splendour. All the stars dissolved like tiny drops of milk, lost when their bowl is suddenly filled to overflowing. So great was the Sun, so irresistible his presence – he whom some compared to a great wild bull bellowing and ordering it over the heavens and the earth alike. But every night the Sun retired to his resting place, and night by night the flaming goddess Sothis entranced and bewitched mortal men, as she rose steadily higher and grew to great perfection. And further and farther ahead of the Sun she rose each night.

But with her absence, how barren, how bleak, the sky now seemed. The disappearance of this renowned beauty from the vault of the heavens seemed such an unbearable deprivation. How the goddess was missed! Many mortal men shed bitter tears not to see the beauty who had infatuated them with her glancing eyes, her winsome smile, her slim waist and delicate feet. Were they never again to see her light tread in the celestial round dance of the stars?

Day followed night, and the sorrow of many became soothed by time's healing wings, which slowly fold themselves around the sufferer in invisible layers of sleep, forgetfulness, and the new interests which life must bring. The beautiful Sothis, though mourned, was lost only to the sight. For all remembered her, and that image of her burned

into memory was so glorious, that to expect her actual presence came to seem almost too much to ask of many-hued, shifting, and various Fate.

Seventy days had elapsed. Hope had long since been abandoned to acceptance, sorrow had become numb. A shepherd had gone out before sunrise to his lambs now fully six months old. The Sun would not long be delayed, it was approaching the time of daybreak. The shepherd looked towards the skyline in the east. And as he looked, he saw the horizon burn with a refulgent fire and the shimmering red birth of the goddess. It was she, it must be she! No other star had that aura, such a penetrating persona. The shepherd stood transfixed, his eyes were seared by this fresh star, dripping it seemed, with the waters of life, and aflame also with the fiery resurgence of its renewed existence. As the quick Sun behind her moved up to erase Sothis's tantalizingly brief appearance, the shepherd turned and ran to the nearest settlement. 'Awake! Awake! The goddess has returned! She is reborn, immortal, come back from death!' And all the devotees assembled with excitement and renewed hope. They heard the tale, saw for themselves the next morning, and they instituted a yearly celebration. This celebration exists to this day, and many are the temples, many are the priests, who gather in the month of July throughout all our land of Egypt to witness the much-heralded yearly rebirth of the great Sothis, bestower of concord and blessings to her people. And in honour of her seventy days spent in the underworld, we have instituted the seventy-day embalming and mummification rites for our own dead, as it is pious and indeed right that we should do.

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I wrote this fairytale, from the point of view of an ancient Egyptian priest, in order to convey to the reader not only certain facts but also certain equally important and,

## THE SIRIUS MYSTERY

unfortunately, extinct emotions. For the attitudes and feelings of ancient peoples are just as important as the dry description of what facts they believed

Sothis was the ancient Egyptian name for Sirius as it was spelt by the Greeks, and it was by the movements of Sirius that they regulated their calendar. The first appearance of Sirius on the western horizon just before the sun – after seventy days in the Duat (Underworld) – was what is called the heliacal rising (or 'with-the-sun' rising) of Sirius. This event occurred once a year and gave rise to the Sothic Calendar, whose details we need not go into



*Figure 13* The heliacal rising of Sirius. Dogon drawing of Sirius and the sun joined together at this moment

The heliacal rising of Sirius was so important to the ancient Egyptians (as indeed it is to the Dogon as well<sup>1</sup>) that gigantic temples were constructed with their main aisles oriented precisely towards the spot on the horizon where Sirius would appear on the expected morning. The light of

Sirius would be channelled along the corridor (due to the precise orientation) to flood the altar in the inner sanctum as if a pin-pointed spotlight had been switched on. This blast of light focused from a single star was possible because of the orientation being so incredibly precise and because the temple would be otherwise in total darkness within. In a huge, utterly dark temple the light of one star focused solely on the altar must have made quite an impact on those present. In this way was the presence of the star made manifest within its temple. One such temple to the star Sirius was the temple of Isis at Denderah in Egypt. An ancient hieroglyphic inscription from that temple informs us <sup>2</sup>

She shines into her temple on New Year's Day, and she mingles her light with that of her father Râ on the horizon.

(Râ is an ancient Egyptian name for the sun.)

The heliacal rising of Sirius was also important to other ancient peoples. Here is a dramatic description by the ancient Greek poet Aratus of Soli of the rising of Sirius<sup>3</sup> (often known as the Dog Star as it is in the constellation Canis, or 'Dog')

The tip of his [the Dog's] terrible jaw is marked by a star that keenest of all blazes with a searing flame and hummen call Sirius. When he rises with the Sun [his heliacal rising], no longer do the trees deceive him by the feeble freshness of their leaves. For easily with his keen glance he pierces their ranks, and to some he gives strength but of others he blights the bark utterly.

We see that this dramatic description of the rising of the star indicates an event which was certainly noticed by ancient peoples. Throughout Latin literature there are many references to 'the Dog Days' which followed the heliacal rising of

Sirius in the summer. These hot, parched days were thought by that time to derive some of their ferocity and dryness from the 'searing' of Sirius. Traditions arose of Sirius being 'red' because it was in fact red at its heliacal rising, just as any other body at the horizon is red. When making rhetorical allusion to the Dog Days, the Latins would often speak of Sirius being red at that time, which it was.

We tend to be unaware that stars rise and set at all. This is not entirely due to our living in cities ablaze with electric lights which reflect back at us from our fumes, smoke, and artificial haze. When I discussed the stars with the late well-known naturalist Seton Gordon, I was surprised to learn that even a man such as he, who had spent his entire lifetime observing wildlife and nature, was totally unaware of the movements of the stars. And he was no prisoner of smog-bound cities. He had no inkling, for instance, that the Little Bear could serve as a reliable night clock as it revolves in tight circles around the Pole Star (and acts as a celestial hour-hand at half speed—that is, it takes twenty-four hours rather than twelve for a single revolution).

I wondered what could be wrong. Our modern civilization does not ignore the stars only because most of us can no longer see them. There are definitely deeper reasons. For even if we leave the sulphurous vapours of our Gomorrah to venture into a natural landscape, the stars do not enter into any of our back-to-nature schemes. They simply have no place in our outlook any more. We look at them, our heads flung back in awe and wonder that they can exist in such profusion. But that is as far as it goes, except for the poets. This is simply a 'gee whiz' reaction. The rise in interest in astrology today does not result in much actual star-gazing. And as for the space programme's impact on our view of the sky, many people will attentively follow the motions of a visible satellite against a backdrop of stars whose positions are absolutely meaningless to them. The ancient mythological

figures sketched in the sky were taught us as children to be quaint 'shepherds' fantasies' unworthy of the attention of adult minds. We are interested in the satellite because we made it, but the stars are alien and untouched by human hands - therefore vapid. To such a level has our technological mania, like a bacterial solution in which we have been stewed from birth, reduced us.

It is only the integral part of the landscape which can relate to the stars. Man has ceased to be that. He inhabits a world which is more and more his own fantasy. Farmers relate to the skies, as well as sailors, camel caravans, and aerial navigators. For theirs are all integral functions involving the fundamental principle - now all but forgotten - of orientation. But in an almost totally secular and artificial world, orientation is thought to be unnecessary. And the numbers of people living at home doped on tranquilizers testifies to our aimless, drifting metaphysic.

We have debased what was once the integral nature of life channeled by cosmic orientations - a wholeness - to the enervated tepidity of skin sensations and retinal discomfort. Our interior body clocks, known as circadian rhythms,\* continue to operate inside us, but find no contact with the outside world. They therefore become ingrown and frustrated cycles which never interlock with our environment. We are causing ourselves to become meaningless body machines programmed to what looks, in its isolation, to be an arbitrary set of cycles. But by tearing ourselves from our context, like the still beating heart ripped out of the body of an Aztec victim, we inevitably do violence to our psyches. I would call the new disease, with its side effect of 'alienation of the young' *dementia temporalis*.

When I tried to remedy my own total ignorance of this

\* In daily rhythms, the word 'circadian' means 'about a day' because the rhythms are not exactly twenty-four hours.

subject originally, I found it an extremely difficult process. I discovered that I was reading coherent explanatory matter which I 'understood' but did not comprehend. For comprehension consists of understanding from the inside as well as understanding from the outside. Things that do not really matter to us, or into which we do not imaginatively project our own consciousness, remain strange to us; we understand them outside (like a man feeling the skin of an orange) but we have no inherent relation with the thing, and hence are ultimately divorced from its reality. This increasing isolation and alienation, a cultural blight of which there is almost universal complaint in the 'civilized' world, is yet another consequence of *dementia temporalis*. For how can you get inside anything in the end if you have ceased to be inside your own local universe with its cycles and natural events? To be outside nature is to be an outsider in all things.

With these observations in mind and a child's fairytale to help guide us into the anteroom of the Egyptian psyche, let us prepare to take a plunge over a waterfall, in the certainty that there is no chance of drowning. I have been over this particular waterfall before, and I assure you that the thrill is absolutely delicious if you just let yourself go. But there is no question about the fact that you will have to swim pretty hard. We're off . . . and immediately we are in the frothing rapids where names and basic guidelines must be established quickly. Professors Neugebauer and Parker, experts in such matters as these, tell us:<sup>4</sup>

The Egyptian calendar-year on which the diagonal star clocks (hitherto called 'diagonal calendars') were constructed is the well-known civil or 'wandering' year which consisted of twelve months of three ten-day weeks, divided into three seasons of four months each, followed by five epagomenal days, called by the Egyptians 'the days upon the year'. The total of 365 days did not vary



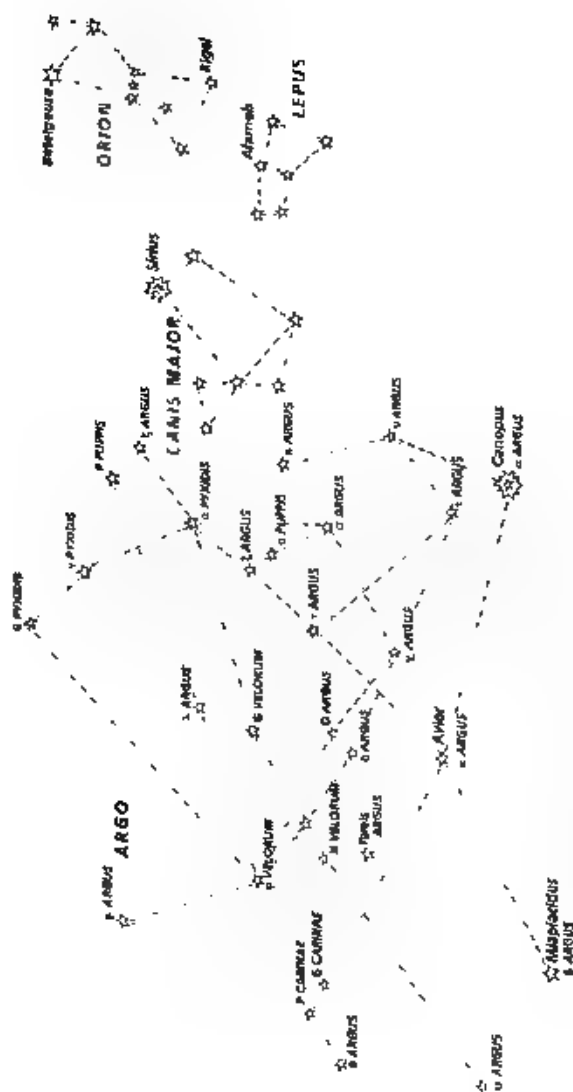


Figure 14 A star map showing the constellations Orion, Lepus (The Hare), Canis Major (the Great Dog, which contains the 'Dog Star' Sirius), and the huge constellation Argo (the Ship). The arrangement of the stars in Argo has been altered somewhat in this star map by the author and cartographer, which is not unusual, since Argo is so large and sprawling that it can rarely if ever be found on a single detailed star map. One can draw a ship almost any way one wants for Argo and still be 'within the rules'. Notice that Orion stands on the hare, which is portrayed in the Greek vase painting reproduced as Figure 42 (see p. 232).



and as a consequence the Egyptian year moved slowly forward in the natural year by, on the average, one day in four years. As we shall see later this was a continuously vexing complication in keeping the star clocks adjusted.

The basis of these clocks was the risings of the stars (conventionally referred to as 'decans') at twelve-hour intervals through the night and in ten-day weeks through the year.

The main star or decan was Sirius. The four decans immediately before it in order comprise the constellation Orion. The last portion of Orion rises above the horizon one 'hour' before Sirius. It was for this reason that Orion took on significance in the Egyptian mythology and religion. The Egyptians were so concerned with Sirius, the star whose rising formed the basis of their entire calendar, that the decan immediately preceding it came to be looked on as Sirius's 'advance man'. Sirius itself was known to the Egyptians as *Spd* or *Spdt* (a 't' ending is feminine). This is sometimes spelt *Sept* and pronounced thus. Orion was known to the Egyptians as *S3h* which is transliterated as *Sah* or *Sah*, and pronounced thus.

Now that we have established a few names and facts, we have to consider the next fundamental point. We must establish, on the professors' word for it, that the star Sirius was actually identified (as Sothis) with the famous goddess Isis, the head of the Egyptian pantheon.

The heliacal rising of Sirius is called in Egyptian *pri Spdt*. Neugebauer and Parker say <sup>5</sup> 'We offer the suggestion that *Spdt* was in origin a nische of *spd* referring to Isis as "the one of *spd*". That *spd* and *spdt* Sothis are both identified with Sirius is one of the rare certainties in Egyptian astronomy. Sothis is a goddess firmly identified with *Spdt* and residing there. Sothis is also identified with the goddess known to us as Isis but whose actual Egyptian name is transliterated as *Ast*.


Professor Wakis Budge was practically the founding father of modern Egyptology. He makes this interesting observation:<sup>6</sup> 'The throne or seat, , is the first sign in the name of As-t, , who is the female counterpart of Osiris, and it is very probable that originally the same conception underlay both names.' Osiris as the husband of Isis was identified with the constellation Orion.

Wakis Budge also said, after giving the following hieroglyphic forms of Osiris:<sup>7</sup>

Osiris,  , As-Ar, or



From the hieroglyphic texts of all periods of the dynastic history of Egypt we learn that the god of the dead, *par excellence*, was the god, whom the Egyptians called by a name which may be tentatively transcribed As-Ar, or Us-Ar, who is commonly known to us as 'Osiris'.

The oldest and simplest form of the name is  

that is to say, it is written by means of two hieroglyphics the first of which represents a 'throne' and the other an 'eye', but the exact meaning attached to the combination of the two pictures by those who first used them to express the name of the god, and the signification of the name in the minds of those who invented it cannot be said.

There is a great elaboration of what As-Ar does *not* mean, referring to the use of puns which particularly delighted Egyptian priests, etc. Two pages later he winds up by saying 'The truth of the matter seems to be that the ancient Egyptians knew just as little about the original meaning of the name As-Ar as we do, and that they had no better means of obtaining information about it than we have.'

The Bozo tribe in Mali, cousins to the Dogon, describe Sirius B as 'the eye star', and here we see the Egyptians designating Osiris by an eye for reasons which are not clear. And Osiris is the 'companion' of the star Sirius. A coincidence? The Bozo also describe Sirius A as 'seated' and a seat is the sign for Isis.

A little later Budge adds: 'in some passages (As-Ar or "Osiris") is referred to simply as "god",

# 7

without the addition of any name. No other god of the Egyptians was ever mentioned or alluded to in this manner, and no other god at any time in Egypt ever occupied exactly the same exalted position in their minds, or was thought to possess his peculiar attributes.' He adds<sup>1</sup> 'The plaque of Hemaka\* proves that a centre of the Osiris cult existed at Abydos under the 1st Dynasty, but we are not justified in assuming that the god was first worshipped there, and it is difficult not to think that even under the 1st Dynasty shrines had been built in honour of Osiris at several places in Egypt.'

Thus we see the immense antiquity of the recognition of Ast and As-Ar (Isis and Osiris), going back well before the

\* Excavated in 1935, this inscribed wooden label was thought to come from the tomb of Hemaka, Chancellor of Egypt, but is now known to be from the tomb of King Udjua of the First Dynasty (c. 3000 BC).

<sup>1</sup> Emery estimates the First Dynasty as commencing around 3200 BC.

dynastic period in Egypt.

Wallis Budge says <sup>9</sup> 'The symbol of Isis in the heavens was the star Sept,







which was greatly beloved because its appearance marked not only the beginning of a new year, but also announced the advance of the Inundation of the Nile, which betokened renewed wealth and prosperity of the country. As such Isis was regarded as the companion of Osiris, whose soul dwelt in the star Sah,




i.e. Orion . . .

Wallis Budge also says <sup>10</sup>

AST, , or , or  , ISIS

Notwithstanding the fact that As, or Ast, i.e. Isis, is one of the goddesses most frequently mentioned in the hieroglyphic texts, nothing is known with certainty about the attributes which were ascribed to her in the earliest times. . . The name Ast has, like As-Ar, up to the present defied all explanation, and it is clear from the punning derivations to which the Egyptians themselves had recourse, that they knew no more about the meaning of her name than we do. . . The symbol of the name

of Isis in Egyptian is a seat, or throne, , but we have

no means of connecting it with the attributes of the goddess in such a way as to give a rational explanation of her name, and all the derivations hitherto proposed must be regarded as mere guesses. . . An examination of the

texts of all periods proves that Isis always held in the minds of the Egyptians a position which was entirely different from that of every other goddess, and although it is certain that their views concerning her varied from time to time and that certain aspects or phases of the goddess were worshipped more generally at one period than at another, it is correct to say that from the earliest to the latest dynasties Isis was the greatest goddess of Egypt. Long before the copies of the Pyramid Texts which we possess\* were written the attributes of Isis were well defined, and even when the priests of Heliopolis assigned her the position which she held in the cycle of their gods between BC. 4000 and BC. 3000 the duties which she was thought to perform in connexion with the dead were clearly defined and were identical with those which belonged to her in the Graeco-Roman period.

I had begun to suspect that the sister-goddess of Isis, who is called Nephthys, represented a possible description of Sirius B, the dark companion star that described a circle around Sirius. (For we have just seen that Isis was identified with Sirius quite precisely by the Egyptians, a fact which no Egyptologist would ever dream of disputing, as it is quite undeniably established as we have seen.) But I must confess that I was not prepared to discover this following passage.<sup>11</sup>

On the subject of Anubis Plutarch reports (44:61) some interesting beliefs. After referring to the view that Anubis was born of Nephthys, although Isis was his reputed mother, he goes on to say, 'By Anubis they understand the horizontal circle which divides the invisible part of the world, which they call Nephthys, from the visible, to which

\* Wallis Budge believes those of the Vth and VIth Dynasties to be copies of earlier writings including those of the Isth Dynasty, see p. 7 of his book.

they give the name of Isis; and as this circle equally touches upon the confines of both light and darkness, it may be looked upon as common to them both – and from this circumstance arose that resemblance, which they imagine between Anubis and the Dog, it being observed of this animal, that he is equally watchful as well by day as night.

This description could be taken to be one of the Sirius system. It clearly describes Isis (whom we know to have been identified with Sirius) as 'the confines of light' and 'the visible', and her sister Nephthys is described as being 'the confines of darkness' and 'the invisible', and common to both is the horizontal circle which divides them – the horizontal circle described, perhaps, by the orbit of the dark companion about the bright star? And here, too, is an explanation of the symbolism of the dog which has always been associated with Sirius, which has borne throughout the ages the name of the 'Dog Star'.

Anubis is variously represented as jackal-headed and dog-headed in Egyptian art. Wallis Budge adds <sup>12</sup> 'Thus much, however, is certain, that in ancient times the Egyptians paid the greatest reverence and honour to the Dog'.

Anubis was also variously represented as the son of Nephthys by Osiris and as being really identical with Osiris himself. A famous tale has him embalm the corpse of Osiris. Osiris was known as Anubis, though, at Oxyrhynchus and Cynopolis <sup>13</sup>

A name similar to Anubis (which is really Anpu in Egyptian) and which is also associated with Isis-Sothis is Anukis, a fellow-goddess who, along with the goddess Satis, sails in the same celestial boat with Sothis in the Egyptian paintings. There are thus the three goddesses together, possibly a description of Sirius A, Sirius B, and Sirius C, and emphasizing that the Sirius system is really thought to be a three-star system. Just to underline the point, Neugebauer

specifically states <sup>4</sup> 'The goddess Sais, who like her companion Anukis is hardly to be taken as a separate constellation but rather as an associate of Sothis.'

The goddess Anukis holds two jars from which she pours water possibly indicating two watery planets around her star? All the references to the Sothic heavens are to a watery, reed-growing paradise. Many archaeologists have surmised that this refers to some specifically Egyptian locale. But no one is sure. What is known is that heaven is almost invariably associated with the Sirius system and is described as being prolific of vegetation and watery.

In Plutarch's famous and lengthy treatise 'Isis and Osiris' (356) we read 'Isis was born in the regions that are ever moist'. In the Loeb Library edition of this, the translator F. C. Babbitt adds a footnote at this point saying: 'The meaning is doubtful.' In other words, no one is really sure what is meant by all these references to Isis-Sothis and the 'moist regions', which are supposed by most scholars quite sensibly to be projections of local Egyptian conditions around the Nile into an ideal celestial region. But most scholars admit that this is mere conjecture. The 'moist regions' could just as well be an attempt to describe some watery planets. It is worth pointing out that in the event of planets in the Sirius system being watery, we must seriously consider the possibility of intelligent beings from there being amphibious.

Perhaps 'the sirens' are, figuratively, a chorus of mermaids recalled from earlier times. By coincidence, in zoology a siren is 'one of a genus (Siren) of eel-shaped amphibians having small forelimbs, but destitute of hind legs and pelvis, and having permanent external gills as well as lungs'. It would be interesting to see how far back in time these creatures were called by their name. As for the singing sirens who lure sailors to the rocks, they are called in Greek *Seirên* (singular), *Seirênes* (plural) and are first mentioned in Homer's *Odyssey*. Homer knew of two sirens, but later there



was a third, and some added a fourth. (Plato decided there were eight because of that number matching the number of musical notes in the octave.) It is interesting that in Greek Sirius is *Seirios*. Liddel and Scott in their definitive Greek lexicon give a meaning of the previous *Seiren* as 'a constellation, like Seirios, Eust. 1709.54'

Another similar word *Seistron* became in Latin *sistrum* and Liddel and Scott define it as 'A rattle used in the worship of Isis. . . .'

Let us now turn our attention to a remarkable book, *Star Names, Their Lore and Meaning* by Richard Hinckley Allen. In this book, under a discussion of the constellation Canis Major (The Dog), which contains Sirius,<sup>5</sup> on p. 130, is a description of the star of the constellation represented by the Greek letter  $\delta$  (delta): It is the 'modern Wezen, from (the Arabic) Al Wazn, Weight, "as the star seems to rise with difficulty from the horizon," but Ideler calls this an astonishing star-name.'

Before leaving the star, it is worth noting that Allen says the Chinese knew it as well as some stars in Argo as 'Hoo She, the Bow and Arrow', and that the bow and arrow is a variation motif associated with the Sirius system by the Egyptians. In Neugebauer we read<sup>16</sup> 'The goddess Satis, who like her companion Anukis is hardly to be taken as a separate constellation but rather as an associate of Sothis. In Dendera B, the goddess holds a drawn bow and arrow.'

More information regarding Al Wazn, 'Weight', is found in Dr. Christian Ludwig Ideler's *Untersuchungen ueber den Ursprung und die Bedeutung der Sternnamen* (Investigations Concerning the Origin and the Meaning of Star Names) Berlin, 1809, which Allen describes as 'the main critical compendium of information on stellar names—Arabic, Greek, and Latin especially. It is to him that we owe the translation of the original Arabic text of Khazwini's *Description of the Constellations*, written in the 13th century, which forms the

basis of the *Sternnamen*, with Ideler's additions and annotations from classical and other sources. From this much information in my book is derived.'

Ideler might well comment that Al Wazn is 'an astonishing star name'. To call a star in the same constellation as Sirius 'too heavy to rise over the horizon with ease' looks suspiciously like an attempt to describe a 'heavy star' such as Sirius B.

Could this reference to a 'heavy star' be a reference to Sirius B by people who have inherited a slightly garbled version of the tradition of its being a super-dense star invisible to the unaided eye - resulting in their seizing on one of Sirius's apparent companions (as seen from the Earth) and giving it a description properly applying to its actual companion? The Arabs do not mention '480 ass loads' to describe its weight in the quaint fashion of the Dogon, but the substance of the idea seems to be present. It is well known that ancient Arabic astronomical lore derives from Egypt and is found in Arabic traditions in a degenerate form. Obviously the search must now be on for this concept of a super-heavy star in Egyptian traditions! I had also always suspected that this most secret tradition of the Dogon reached them from Egypt. It will not be easy for us to discover, as it must have been an extremely esoteric and secret teaching of the Egyptians, just as it was the most secret teaching of the Dogon. In searching for this, it will be helpful for us to look at the Greek traditions for greater clarification, as well as to turn to ancient Sumer.

A further use of the name Wazn is its loose application to the star Canopus in the constellation Argo.<sup>17</sup> Allen, in describing the Argo, quotes the ancient Greek poet Aratos, in a passage showing us something of the relation Argo bears to Canis Major, the Great Dog:

Sternforward Argo by the Great Dog's tail  
Is drawn

Argo is the constellation representing both Jason's ship with its fifty Argonauts and Noah's ark.

Jason's *Argo* 'carried Danaos with his fifty daughters from Egypt to Rhodes, as Allen puts it. He adds, 'The Egyptian story said that it was the ark that bore Isis and Osiris over the deluge, while the Hindus thought that it performed the same office for their equivalent Isis and Iswara.'

Allen's old-fashioned spelling 'Iswara' is a reference to the word 'Ishvara'. There are some interesting facts to be gleaned from perusing the meanings of the Sanskrit word *ishu*, which basically means 'an arrow'. Recall the connection of the bow and arrow with Sirius among both the Egyptians and the Chinese (Further examples are given in the book *Hamlet's Mill* by Santillana and von Dechend, along with interesting illustrations.) Now note from Monier-Williams's definitive Sanskrit dictionary that *ishu* means not only 'arrow' but 'ray of light'. *Ishvasu* means 'a bow' or 'an archer'. Remember the three goddesses and note this that *Ishustrikanda* which literally means 'the threefold arrow', is specifically meant to be the name of a constellation! Monier-Williams says it is 'perhaps the girdle of Orion' (which has three prominent stars). The interested reader must refer to *Hamlet's Mill* for a great deal of discussion of Sirius the Bow Star. *Hamlet's Mill* is one of the most fascinating books about ancient astronomical lore. In Plate 25 a Babylonian cylinder seal shows the heliacal rising of Sirius, with Sirius portrayed graphically as the Bow Star!

We have previously encountered this idea of the celestial boats in Egypt where their gods sailed through the waters of the heavens. The three Sirius-goddesses: Sothis, Anukis, and Satis, were all in the same boat. So it is interesting to see that *Argo* was a boat connected with Isis and Osiris, for a concept which seems to be peculiarly stubborn in attaching itself to *Argo* is the number fifty. It is my suspicion that this is a remnant of the concept of Sirius B taking fifty years to complete

an orbit around Sirius A. This suggestion is not as far-fetched as it may seem at first sight. Indeed, the reader will discover as he proceeds that the suggestion will become more and more obvious. We must realize that in Egyptian terms the orbit of Sirius B around Sirius A could have been expressed in terms of a celestial boat. Now since *Argo* is the boat of Isis and Osiris, what better way to express the fifty-year orbit than by giving the boat fifty oarsmen? And that is what *Argo* has — in the tradition there are fifty rowers, or Argonauts.

In order to fortify my argument I shall quote Allen's precise way of describing this: <sup>18</sup> 'Mythology insisted that it was built by Glaukos, or by Argos, for Jason, leader of the fifty Argonauts, *whose number equalled that of the oars of the ship*.' In other words, it is not the men but the *number of oars* laid out in line around the ship that is important. A ship (an orbit) with fifty oars (fifty 'markers' or yearly stages)!

But before moving on, it is worth giving an illustration of the concept of 'the rower' in the celestial barque from an ancient Egyptian coffin text 'The Field of Paradise' <sup>19</sup> — in the place where Re (the Sun) sails with rowing, I am the keeper of the halyard in the boat of the god, I am the oarsman who does not weary in the barque of Re' (Re is another form of the more familiar Ra.)

The first person in this text refers to the deceased Pharaoh. This is one of the examples of the common Egyptian conception that when a Pharaoh died he became a celestial rower. It should be obvious, then, how the concept of 'fifty rowers' by fifty positions, or oars, came to be important as symbols in ancient Greece. It harks back to this Egyptian motif.

Now we must turn to the Sumerian civilization (which later developed into the Babylonian civilization). Sumer-Akkad was roughly contemporaneous with ancient Egypt, and the lands are known to have been in contact. In a major source we read<sup>20</sup> of the Sumerian word Magan 'The land

Magan is usually identified either with Arabia or with Egypt.'

But whatever contact the two civilizations may have had, we must first investigate the Sumerian religion and mythology. For this we rely primarily on the excellent work of the late Professor Samuel Noah Kramer of the University of Pennsylvania. Kramer accepted me as a special student there in the 1960s, but our association was terminated by a severe heart attack which forced him into temporary retirement. He eventually lived into his nineties.

The Sumerian heaven-god is called Anu (In Sanskrit *anupa* means 'a watery country') I had a considerable shock when I discovered that Alexander Heidel says in *The Babylonian Genesis*: '... just as the departed spirits of Enlil and Anu were pictured as the wild ass and the jackal respectively.'<sup>21</sup> Anu is represented by the jackal. Well, of course, the jackal is the symbol (interchangeable with the dog) of the Egyptian Anpu (Anubis)!

I shall explain later why I consider Anu to be related to the Sirius question, apart from this obvious parallel. At the moment I shall deal with further related parallels which I consider amazing. Anu is the king of some attendant deities called the Anunnaki. Note the recurrence in Sumer of 'Anu' in both Anu and the Anunnaki, and in Egypt with both Anpu (Anubis) and Anukis. In all these cases Sirius is involved. The jackal or dog is common as a symbol to the 'Anu' in both countries. There are other parallels, but we shall come to them in due course.

In Sumerian the word *an* means 'heaven' and Anu is the god of heaven.

Wallis Budge says<sup>22</sup> that the Egyptian god Nu was often identified with Nut which is 'heaven'.

Significantly, he expressly states:<sup>23</sup>

It is surprising therefore to find so much similarity existing between the primeval gods of Sumer and those of

Egypt, especially as the resemblance cannot be the result of borrowing. It is out of the question to assume that Ashur-banipal's editors borrowed the system from Egypt, or that the literary men of the time of Seti I borrowed their ideas from the *literati* of Babylonia or Assyria, and we are therefore driven to the conclusion that both the Sumerians and the early Egyptians derived their primeval gods from some common but exceedingly ancient source. The similarity between the two companies of gods seems to be too close to be accidental.

I had come to all these conclusions myself before seeing this passage by Wakis Budge.

But to return to Anu. Osiris is sometimes known as An.<sup>24</sup> In a hymn to Osiris<sup>25</sup> he is called the god An of millions of years 'and also 'An in An tes, Great One, Heru-khuta, thou stridest over heaven with long strides'. Therefore this designation as An is specifically connected with heaven and the long strides mean heavenly motion.

In considering An and Anu we must look again at Anubis. But as we do so we shall take a glance at the Sanskrit. Recall that Anubis in Plutarch's account seemed to refer specifically to the orbit of Sirius B. In Sanskrit the word *anda* means 'ellipse', and the word *anu* means 'minute, atomic, "the subtle one", an atom of matter' and *anman* means ' minuteness, atomic nature, the smallest particle, the superhuman power of becoming as small as an atom'. The first word could describe an orbit. Since Kepler, we have known that our planets move in elliptical orbits rather than circular ones, and the orbit of Sirius B is that of an ellipse. As for the next two forms *anu* and *anman*, they seem to have meanings perilously peripheral to an account of that level of matter (the atomic) where the nature of Sirius B is manifested. (We shall see later in this book that other similarities exist between certain Sanskrit terms relevant to the Sirius question and like terms

in Egypt and the Near East, they will be shown to have considerable importance.)

Wallis Budge says of Anubis.<sup>26</sup> 'His worship is very ancient, and there is no doubt that even in the earliest times his cult was general in Egypt, it is probable that it is older than that of Osiris.' Also he points out here, as elsewhere, that the face of the deceased human becomes identified with Anubis, and it is just the head of Anubis which is symbolically represented by the jackal or dog. I have already pointed out that he is described as the circle or orbit separating the dark Nephthys from the light Isis or Sirius. In other words, I take Anubis to represent the orbit of Sirius B around Sirius A. We also find him described as 'time',<sup>27</sup> a particularly intelligent way of looking at an orbit as progressive and sequential in time. 'Time the devourer', a motif common to us all, is no stranger to the Egyptians. It should not surprise us that Anubis is also represented as a devourer! More specifically, he is accused of devouring the Apis bull. The Apis bull is the animal into which the dead Osiris was sewn and transported, according to a late legend which is widely known. But more basically, the 'Apis Bull' (the deity known under the Ptolemies as Serapis) is *Asar-Hapi*. It is Osiris himself! In *The Gods of the Egyptians*, we read 'Apis is called "the life of Osiris, the lord of heaven"' and 'Apis was, in fact, believed to be animated by the soul of Osiris, and to be Osiris incarnate'.<sup>28</sup> So consequently, when Anubis devoured Apis, he was eating the husband of Isis! It is very colourfully represented in these dramatic mythological terms, but the meaning is clear. We read later.<sup>29</sup>

Others again are of the opinion that by Anubis is meant Time, and that his denomination of *Kuon* [the Greek word for 'dog'] does not so much allude to any likeness which he has to the dog, though this be the general rendering of the word, as to that other significance of the

term taken from *breeding*, because Time begets all things out of itself, bearing them within itself as it were in a womb. But this is one of those secret doctrines which are more fully made known to those who are initiated into the worship of Anubis.

Exactly A secret doctrine! What one would give for a fuller account! This is the trouble with most of our sources, they give away little except by inference. Secret doctrines are not scribbled down too frequently and left for posterity. The most secret doctrine of the Dogon was only revealed with great reluctance after many, many years, and following a conference by the initiates. The Egyptians were no fools, and we can hardly expect them to have left papyri or texts specifically revealing in so many words what they were not supposed to reveal. We can only try to piece together clues. But we will see our clues eventually turn into a veritable avalanche.

The last passage from Wallis Budge was a quotation by him from Plutarch's 'Isis and Osiris'. Many Egyptologists have remarked on the irony that we have nowhere in Egyptian sources a full, coherent account of Isis and Osiris, not even in all the sources put together! And we are forced to rely on Plutarch, who did preserve a long account which he wrote in his native Greek. Plutarch (first century A.D.) was a priest at Delphi for the last thirty years of his life. One of his best friends was the priestess Clea at Delphi. His treatise 'Isis and Osiris' is dedicated to Clea and addressed to her. It begins with these words. 'All good things, my dear Clea, sensible men must ask from the gods; and especially do we pray that from those mighty gods we may, in our quest, gain a knowledge of themselves, so far as such a thing is attainable by men.' This gives some indication of what Plutarch was like as a man.

The Introduction to the Loeb edition of Isis and Osiris by



F. C. Babbitt says. '[Plutarch] once visited Egypt, but how long he stayed and how much he learned we have no means of knowing. It is most likely that his treatise represents the knowledge current in his day, derived, no doubt, from two sources: books and priests.' It is certain that Plutarch, who was so important at Delphi as a priest, would have had ample introductions to the leading priests of Egypt. This sort of thing was standard practice—as with the study of Egyptian religion and astronomy undertaken centuries earlier by the Greek scholar Eudoxus (colleague of Plato and Aristotle), who was given a letter of introduction to the last of the native Pharaohs, Nectanebo, by the Spartan general Agesilaus, and who in turn sent him off to associate with his priests. So, no doubt Plutarch did with the Egyptian priests what Griaule and Dieterlen did with the Dogon—drew some secret traditions out of them. It is thus not surprising that Plutarch's essay is more respected by Egyptologists than by classicists.

Plutarch says, 'Some are of the opinion that Anubis is Cronos'<sup>10</sup> Chronos, of course, was the Greek 'time the devourer', spelt with an *h*. Cronos in Latin is Saturn. There is a considerable debate among scholars whether Cronos (Saturn), the former chief god prior to Zeus (Jupiter), has any definite relation to the word *chronos* spelt with the *h* and sometimes used as a proper name for Time. From this latter word we derive *chronology*, *chronicle*, etc. The Sumerian god Anu is quite similar to the Greek Cronos because both Cronos and Anu were 'old' gods who were displaced by younger blood—by Zeus and Enlil respectively. Thus another possible link between Anu and Anubis, if one be willing to grant that Cronos and Chronos are not entirely separate words and concepts in ancient pre-classical Greece.

Wallis Budge continues with reference to Plutarch:

Referring to Osiris as the 'common Reason which pervades both the superior and inferior regions of the

universe', he [Plutarch] says that it is, moreover, called 'Anubis, and sometimes likewise Hermanubis (i.e. Herem-Anpu), the first of these names expressing the relation it has to the superior, as the latter, to the inferior world. And for this reason it is, they sacrifice to him two Cocks, the one white, as a proper emblem of the purity and brightness of things above, the other of a saffron colour, expressive of that mixture and variety which is to be found on those lower regions.'

Here is what I take to be a possible reference to the white Sirius A and the 'darker' Sirius B. But also, the 'lower regions' are the horizons, where white heavenly bodies at their 'births' and 'deaths' become saffron-coloured.

There is a clearer translation by Babbitt in the precise description of Anubis as 'the combined relation of the things' rather than as 'the common Reason which pervades' the light world and the dark world. A circular orbit is just that 'a combined relation' between the star revolving and the star revolved around. In order to make this more firmly established less as fancy than as fact, I shall cite Plutarch's words from his next paragraph (Babbitt's translation): 'Moreover, they (the Egyptians) record that in the so-called books of Hermes (the Trismegistic literature? — see page 103) it is written in regard to the sacred names that they call the power which is assigned to direct the revolution of the Sun Horus.' This is important because we see here that they specifically call the orbit of the sun by a god's name. If they can call the revolution of the sun by a god's name, they can call the revolution of Sirius B (assuming they really knew about it) by a god's name. We are dealing with a precedent. Now we resume this quotation because it is interesting for other reasons: 'but the Greeks call it Apollo; and the power assigned to the wind some call Osiris and others Serapis; and Sothis in Egyptian signifies "pregnancy"'

(cycsis) or "to be pregnant" (cycin): therefore in Greek, with a change of accent, the star is called the Dog-star (Cyon), which they regard as the special star of Isis.'

A further piece of information from Plutarch about Anubis is:<sup>32</sup> 'And when the child (Anubis, child of Nephthys by Osiris) had been found, after great toil and trouble, with the help of dogs which led Isis to it, it was brought up and became her guardian and attendant, receiving the name Anubis, and it is said to protect the gods just as dogs protect men.'

If Anubis is conceived of as an orbit around Sirius, then he would indeed be attendant upon Isis! He would go round and round her like a guard dog

Plutarch provides us with an important crucial clue linking Isis with the *Argo* and the Argonauts and demonstrating a probable derivation of an idea that has puzzled classicists enormously: 'Like these also are the Egyptian beliefs, for they oftentimes call Isis by the name of Athena, expressive of some such idea as this, "I came of myself," which is indicative of self-impelled motion.'<sup>33</sup>

It must be remembered that the Greek goddess Athena, the goddess of the mind and of wisdom, was reputed to have sprung full-fledged from the brow of Zeus. She was not born. She came of herself. However, the quotation must be continued to make the point.

Typhon, as has been said, is named Seth and Bebon and Smu, and these names would indicate some forcible and preventive check or opposition or reversal.

Moreover, they call the lodestone the bone of Horus, and iron the bone of Typhon, as Manetho records. For, as the iron oftentimes acts as if it were being attracted and drawn toward the stone, and oftentimes is rejected and repelled in the opposite direction, in the same way the

salutary and good and rational movement of the world at one time, by persuasion, attracts and draws towards itself and renders more gentle that harsh and Typhonian movement, and then again it gathers itself together and reverses it and plunges it into difficulties.

The identification of Isis with Athena here in connection with lodestones and 'self-impelled motion' brings to mind the placing by Athena of a cybernetic\* oak timber from the holy sanctuary of Dodona (supposedly founded by Deukalion, the Greek Noah, after his ark landed) in the keel of the *Argo* (see Figure 15). H. W. Parke in his books *Greek Oracles* and *The Oracles of Zeus* refers to this. 'Athena when the *Argo* was built took a timber from the oak tree of Dodona (the oracular centre of Zeus) and fitted it into the keel. This had the result that the *Argo* itself could speak and guide or warn the Argonauts at critical moments, as it actually is represented as doing in our extant epics on the subject. The original epic is lost, but there is no reason to doubt that this miraculous feature went back to it, and, if so, was at least as old as the *Odyssey* in which the *Argo* and its story are mentioned.' (The oracle at Dodona and its oak leaves are also mentioned in the *Odyssey*.) Parke then emphasizes most strongly that it is the timber itself that acts as guide. It is self-actuating and not merely an oracular medium. Thus we see that the *Argo* had a unique capacity for 'self-impelled motion' which was built into it by Athena (whom Plutarch identifies with Isis).<sup>34</sup>

We leave the fifty Argonauts and their magical ship to turn our attention to what appears to be a rather precise Egyptian description of the Sirius system preserved in an unusual

\* Norbert Wiener in *Cybernetics*, the pioneer textbook of computer theory said: 'We have decided to call the entire field of control and communication theory whether in the machine or in the animal, by the name *Cybernetics* (from the Greek for) *steersman*'.

Jupiter Dodonaeus



M. Dodonaeus in templo  
 a vales quae in alio templo jup

Figure 15 An engraving from 1675 showing 'Jupiter Dodonaeus' – the god Zeus in his sacred grove at the Oracle of Dodona. Behind him, an oak tree is shown with an anthropomorphic trunk because its leaves 'speak the oracles' with a rustling voice like the wind. On Zeus's shoulder sits an oracular dove, although it is badly drawn with a tuft on its head, the original Latin caption confirms that it is meant to be a dove nevertheless. According to Herodotus in the fifth

century BC, the Egyptians of his day claimed that the Oracle of Dodona was founded by two doves which flew from Thebes in Egypt and came to rest on that spot. As I have explained at length in my book *Conversations with Eternity* (Rider, London, 1984), where I have gathered together all the ancient textual evidence, the oracular doves of the oracle centres were carrier pigeons who carried messages over hundreds of miles in a day, enabling the oracular priests and priestesses to make 'predictions' based on instant reports of distant events. This secret carrier pigeon network was the real basis for the political power of the oracle centres. 'Carrier-swallows' were also used. From the sacred oak in this picture hangs a garland dedicated by someone who has consulted the oracle and departed. Zeus has his arm protectively around a smaller figure perhaps intended to represent one of the *Selloi* – the oracular priests who slept on the ground beneath the oak trees on beds of leaves. This was a practice which they presumably discontinued during the winters, when Dodona can hardly have been 'open for business', although the actual oak leaves themselves would not have fallen at that season – the oaks at Dodona would have been holm oaks, which are evergreen.

source. The source is G. R. S. Mead (who was a friend of the poet Yeats and is mentioned by his nickname 'Old Crone' in Ezra Pound's *Cantos*), whose three-volume *Thrice Greatest Hermes*<sup>5</sup> contains a translation of, with extensive prolegomena and notes to, the obscure and generally ignored ancient 'Trismegistic literature' of the Hermetic tradition.\* These writings are largely scorned by classical scholars who consider them Neoplatonic forgeries. Of course, ever since the wild Neoplatonic boom in the Italian Renaissance period when Marsilio Ficino translated and thereby preserved for posterity (one must grant the Medicis the credit for finding and purchasing the manuscripts!) such Neoplatonists as Iamblichus, as well as these Trismegistic writings, the Neoplatonists have been in the doghouse.

But most readers will not be familiar either with the term 'trismegistic' or with the Neoplatonists. So I had better explain. The Neoplatonists are Greek philosophers who lived long enough after Plato to have lost the name of Platonists as far as modern scholars are concerned (though they were intellectual disciples of Plato and considered themselves Platonists). Modern scholars have added the prefix 'Neo-' to 'Platonist' for their own convenience, in order to distinguish them from their earlier predecessors, those Platonists who lived within 150 years of Plato himself. The Platonic Academy existed for over nine centuries at Athens. In actuality, scholars talk about 'Middle Platonists', 'Syrian Platonists', 'Christian Platonists', 'Alexandrian Platonists', and so on. I suggest the reader look at my Appendix II which will tell him a lot about the Neoplatonists and their connection with the Sirius mystery, and which deals primarily with the Neoplatonist Proclus.

G. R. S. Mead, at the beginning of his work *Thrice*

\* The epithet 'Thrice Greatest' has not been definitely explained, but may refer to the three degrees of initiation in the Egyptian mysteries.

*Greatest Hermes*, explains fully what 'the 'Trismegistic Literature' is. He calls it 'Trismegistic' instead of by its earlier designation 'Hermetic' (from the name of the Greek god Hermes) in order to distinguish it from other less interesting writings such as the Egyptian Hermes prayers and also the 'Hermetic Alchemical Literature'. The Trismegistic writings are now fragmentary and consist of a large amount of exceedingly strange sermons, dialogues, excerpts by Stobaeus (an anthologist of the early fifth century AD) and the Fathers of the Church from lost writings, etc. I hesitate to give a brief summary of them and suggest that the interested reader actually look into this subject himself. There are some matters which defy summary, and I consider this to be one of them. The writings contain some 'mystical' elements and certainly some sublime elements. Old Cosimo de Medici was told by Ficino that he could translate for him either the Hermetic Literature or the dialogues of Plato, but not both at once. Cosimo knew he was dying. He said something like 'If only I could read the Books of Hermes, I would die happy. Plato would be nice but not as important. Do the Hermes, Ficino.' And Ficino did.

As I explain fully in Appendix II, the Neoplatonists are so thoroughly despised through the bias of the moment, however one cares to define that bias, that the Trismegistic literature suffers with Neoplatonism under the onus of being considered too far removed from reality and logic and being inclined towards the mystical. This does not fit well with the hard rationalism of an age still bound by the (albeit decaying) fetters of nineteenth-century scientific deterministic prejudice. The sublime irony is, of course, that proven and authentic Egyptian texts are obviously mystical, but that is considered all right. However, as long as there is a belief that the Trismegistic literature is Neoplatonic it will be despised because it is mystical.

The Trismegistic literature may be Neoplatonic. But that

does not make what it has to say about Egyptian religion any less valid *per se* than the 'Isis and Osiris' by the Greek Plutarch, who was only slightly earlier in time than the Neoplatonist Greeks. It is time for scholars to pay some attention to this sadly neglected material. Much of the Trismegistic literature probably goes back to genuine sources or compilations such as Manetho's lost *Sothis*. (Manetho, High Priest of Egypt *circa* 280 BC, wrote a history of Egypt and other works in Greek, of which fragments survive.) Or the literature may be quite ancient, in which case some of it cannot, in its present form, be earlier than the Ptolemaic period when the Zodiac as we know it was introduced into Egypt by the Greeks who in turn had it from Babylon. (I cannot here discuss the matter of earlier forms of zodiac, such as at Denderah.)

Mead quotes an Egyptian magic papyrus, this being an uncontested Egyptian document which he compares to a passage in the Trismegistic literature 'I invoke thee, Lady Isis, with whom the Good Daimon doth unite, He who is Lord in the perfect black' <sup>36</sup>

We know that Isis is identified with Sirius A, and here we may have a description of her star-companion 'who is Lord in the perfect black', namely the invisible companion with whom she is united, Sirius B.

Mead, of course, had no inkling of the Sirius question. But he cited this magic papyrus in order to shed comparative light on some extraordinary passages in a Trismegistic treatise he translated which has the title 'The Virgin of the World'. In his comments on the magic papyrus Mead says, 'It is natural to make the Agathodaimon ("the Good Daimon") of the Papyrus refer to Osiris, for indeed it is one of his most frequent designations. Moreover, it is precisely Osiris who is pre-eminently connected with the so-called "underworld", the unseen world, the "mysterious dark". He is lord there — and indeed one of the ancient mystery-sayings was precisely, "Osiris is a dark God"'



'The Virgin of the World' is an extraordinary Trismegistic treatise in the form of a dialogue between the hierophant (high priest) as spokesman for Isis and the neophyte who represents Horus. Thus the priest instructing the initiate is portrayed as Isis instructing her son Horus.

The treatise begins by claiming it is 'her holiest discourse' which 'so speaking Isis doth pour forth'. There is, throughout, a strong emphasis on the hierarchical principle of lower and higher beings in the universe—that earthly mortals are presided over at intervals by other, higher, beings who interfere in Earth's affairs when things here become hopeless, etc. Isis says in the treatise: 'It needs must, therefore, be the less should give place to the greater mysteries.' What she is to disclose to Horus is a *great* mystery. Mead describes it as the mystery practised by the arch-hierophant (chief priest). It was the degree (here 'degree' is in the sense of 'degree' in the Masonic 'mysteries', which are hopelessly garbled and watered-down versions of genuine mysteries of earlier times) 'called the "Dark Mystery" or "Black Rite"'. It was a rite performed only for those who were judged worthy of it after long probation in lower degrees, something of a far more sacred character, apparently, than the instruction in the mysteries enacted in the light.

Mead adds: 'I would suggest, therefore, that we have here a reference to the most esoteric institution of the Isiac tradition . . .', Isiac meaning of course 'Isis-tradition', and not to be confused with the Book of Isaiah in the Bible (so that perhaps it is best for us not to use the word-form 'Isiac').

It is in attempting to explain the mysterious 'Black Rite' of Isis at the highest degree of the Egyptian mysteries that Mead cited the magic papyrus which I have already quoted. He explains the 'Black Rite' as being connected with Osiris being a 'dark god' who is 'Lord of the perfect black' which is 'the unseen world, the mysterious black'.

This treatise 'The Virgin of the World' describes a

personage called Hermes who seems to represent a race of beings who taught earthly mankind the arts of civilization after which. 'And thus, with charge unto his kinsmen of the Gods to keep sure watch, he mounted to the stars'

According to this treatise mankind have been a troublesome lot requiring scrutiny and, at rare intervals of crisis, intervention. For the significant passage, now, here is the entire paragraph: 'To him (Hermes) succeeded Tat, who was at once his son and heir unto these knowledges [this almost certainly implies a priesthood], and not long afterwards Asclepius-Imuth, according to the will of Ptah who is Hephaestus, and all the rest who were to make enquiry of the faithful certitude of heavenly contemplation, as Foreknowledge (or Providence) willed, Foreknowledge queen of all'

Now this is a really striking passage. We have the mysterious 'Hermes' succeeded by an Egyptian priesthood of Thoth who were initiates into the celestial mysteries. Then 'not long afterwards' we have someone called Asclepius-Imuth 'according to the will of Ptah'. This is Imhotep! The extraordinary Imhotep, a brilliant genius, philosopher, doctor, and Prime Minister (to use our terms) during the Third Dynasty in Egypt *circa* 2600 BC under King Zoser, whose tomb and temple he constructed and designed himself (This is the famous step pyramid at Sakkara, the first pyramid ever built by man and the world's earliest stone building according to some.) Imhotep was over the centuries gradually transformed into a god and 'a son of Ptah'. One reason why the process of his deification may have been retarded for some thousands of years is that writings by him survived, rather like the survival of the *Gathas* by Zarathustra (Zoroaster), making it impossible to claim that a man who left writings could in fact have been a god. Just like Mohammed and Zoroaster, Imhotep remained a sort of 'prophet' through his surviving writings. Ptah - known to the Greeks as

Hephaestus, god of fire and the forge, and husband of Aphrodite was considered the father of Imhotep in late Egyptian times. In fact, it is interesting that this text avoids the late form 'son of Ptah' to describe Imhotep. Imhotep was known to the Greeks and provided the basis for their god Asclepius (the Greek god of medicine, corresponding to Imhotep's late form as Egyptian god of medicine) Imhotep is also spelled Imouthes, Imothes, Imuteb, etc.\* Hence the form in this treatise 'Asclepius-Imuth'

There is absolutely no question that Imhotep is being referred to here. And in the light of that, certain other statements in this passage become quite interesting.

It has already been mentioned that in a treatise like 'The Virgin of the World', where gods' names are thrown round like birdseed, the authors were exceedingly restrained to have avoided labeling Asclepius-Imhotep as 'a son of Ptah-Hephaestus'. This may, indeed, point to a genuine early source from the time before that when the Egyptians ceased to regard Imhotep as a mortal

Hurry says:<sup>37</sup>

For many years Egyptologists have been puzzled to explain why Imhotep who lived in the days of King Zoser, *ca.* 2900 BC, was not ranked among the full gods of Egypt until the Persian period, dating from 525 BC. The apotheosis of a man, however distinguished, so many centuries after his life on earth seems mysterious. The explanation appears to be that first suggested by Erman, viz. that Imhotep, at any rate during a large part of the interval was regarded as a sort of hero or demigod and received semi-divine worship. Erman suggested that this rank of demigod was bestowed on him at the time of the

\* Egyptian hieroglyphs can be transliterated in different ways but in this case there seem to be variant forms of the Greek version of the name as we

## THE SIRIUS MYSTERY

New Kingdom, i.e. about 1580 BC, but more recent evidence seems to indicate that this demigod stage was reached at a much earlier period.

Here a bit of chronology helps. 'The Virgin of the World' correctly described Imhotep as 'not long afterwards', following upon the creation of the Egyptian priesthood, presumably in the First Dynasty after Menes (*circa* 3300 BC), in the form in which it would be known after the unification of Egypt. Imhotep lived in the Third Dynasty, at the beginning of the Old Kingdom. I. F. S. Edwards<sup>38</sup> estimates this as commencing about 2686 BC. He puts the start of the First Dynasty about 3100 BC. Imhotep is thus literally 'not long afterwards'. Whoever wrote 'The Virgin of the World' knew his Egyptian chronology and also did not call Imhotep son of Ptah.

There is another point. Looking at this statement from 'The Virgin of the World' '... and all the rest (i.e. after Imhotep) who were to make enquiry of the faithful certitude of heavenly contemplation', we find that we have a reference to successors of Imhotep who 'enquired' into the riddles of the universe and also a description of Imhotep's own activities as an 'enquirer'. This reflects considerable knowledge of the subject. For Imhotep is often described as the first genuine philosopher known by name. And on p. 30 of his book, Hurry refers to apparent successors mentioned in an Oxyrhynchus papyrus (in Greek, edited by Grenfell and Hunt) which relates that 'Imhotep was worshipped as early as the IVth Dynasty, and his temple was resorted to by sick and afflicted persons'. Hurry further says, 'The other persons are Horus son of Hermes, and Kalebibis son of Apollo (Imhotep being a son of Ptah), it is not known who these were'. Could they have been successors of Imhotep at 'enquiring'?

Hurry refers to the Trismegistic (Hermetic) literature as follows: 'If the references to Imhotep in Hermetic literature

can be trusted, he was also interested in astronomy and astrology, although no special observations are associated with his name. Sethe gives various references to that literature, showing that Imhotep was reputed to have been associated with the god Thoth (Hermes) in astronomical observations.<sup>39</sup> Obviously Imhotep, as chief priest under King Zoser, was associated with Thoth (Tat, in the form of the priesthood previously mentioned who had the 'Dark Rite' as their highest mystery. Here is actual confirmation, then, that it was astronomical matters with which they dealt

Inscriptions in a temple at Edfu (in the far south of Egypt near to Aswan) built by Ptolemy III Euergetes I (237 BC.) describe Imhotep as 'the great priest Imhotep the son of Ptah, who speaks or lectures' HARRY says 'Imhotep enjoyed the reputation of being "one of the greatest of Egyptian sages" <sup>40</sup> his fame for wisdom made so deep an impression on his countrymen that it endured as a national tradition for many centuries. 'As regards his literary activities, he is said to have produced works on medicine and architecture, as well as on more general subjects, and some of his works were extant at the dawn of the Christian era. his eminence as a man of letters led him to be recognized as the "patron of scribes" '

In other words, he was the first great philosopher. And he obviously 'spoke and lectured' in his lifetime. Perhaps he was the first classical Greek in prototype. We also have something to look forward to — his tomb has yet to be discovered. It is thought to be at Sakkarā (a little south of Giza, on the same side of the Nile), and the late Professor Emery more than once thought he had come close to discovering it in his excavations there. Its discovery would be the most important in archaeological history, beside which the minor and later tomb of a boy Pharaoh named Tutankhamen would entirely pale by comparison. But perhaps the most interesting thing about the possible forthcoming discovery of Imhotep's tomb is that it

will almost certainly be full of books. Would a man like Imhotep be buried without them?

It is interesting to read this passage in 'The Virgin of the World' following shortly upon that previously quoted

The sacred symbols of the cosmic elements were hid away hard by the secrets of Osiris. Hermes, ere he returned to Heaven, invoked a spell on them, and spake these words.

'O holy books, who have been made by my immortal hands, by incorruption's magic spells (at this point there is a lacuna as the text is hopeless) free from decay throughout eternity remain and incorrupt from time! Become unseeable, unfindable, for every one whose foot shall tread the plains of this land, until old Heaven doth bring forth meet instruments for you, whom the Creator shall call souls.'

Thus spake he, and, laying spells on them by means of his own works, he shut them safe away in their own zones. And long enough the time has been since they were hid away

In the treatise the highest objective of ignorant men searching for the truth is described as '(Men) will seek out the inner nature of the holy spaces which no foot may tread, and will chase after them into the height, desiring to observe the nature of the motion of the Heavens.

'These are as yet moderate things. For nothing more remains than Earth's remotest realms, nay, in their daring they will track out Night the farthest Night of all'

We 'will chase out into the height' of space to 'observe the nature of the motions of the Heavens' says this old (indeterminately old) treatise. How correct it was. We have now landed on the moon, which is 'chasing out into the height' with a vengeance. And we are indeed 'observing the nature of the motion of the Heavens' And the treatise is also

right in saying that 'these are yet moderate things' For, as everyone knows, the people in the space programme feel as if they have only just begun. Man will only pause properly again when he has made the entire solar system his familiar and his own. Then we shall be faced with the limitations of our solar system and the barrier that separates it from the stars. What then? Yes, what we have done to date certainly deserves the description of 'yet moderate things'. Vasco da Gama may have congratulated himself on his brilliant navigational accomplishments, but as we can clearly see in his case, a beginning is only a beginning. It is 'yet moderate things'.

According to the treatise after these moderate things we shall 'in our daring' even learn the greatest secret — we shall discover 'Night'. And the meaning of the 'Dark Rite' will become clear. And as this rite and this mystery concern Isis and the star Sirius and by the context of this prophecy clearly concern the heavens, can we be accused of sensationalism in making the suggestion that nothing would shake up the human race more than having the discovery of intelligent life elsewhere in the universe proven for the first time? And what if the dark companion of Sirius really does hold the answer to this mystery? What if the nearest centre of civilization really is based at the Sirius system and keeps a watchful eye on us from time to time? What if this is proven by our detecting on our radio telescopes actual traces of local radio communications echoing down those nine light years of space in the vast spreading ripple of disintegrating signals that any culture remotely near to us in development would be bound to dribble forth into the surrounding universe? What if this happens? It will be like the sky falling in, won't it?

## Notes

1. *Le Renard pale*, p. 325. Figure 109 in that book shows it, drawn as 'the meeting of Sirius with the Sun'. We have reproduced it here as Figure 13.
2. Mariette, *Denderah*, Vol. I, p. 206.
3. Aratus, *Phaenomena* 331-6. English translation in Loeb Library series, in volume with Callimachus and Lycophron. See Bibliography.
4. Vol. I, p. 1, of *Egyptian Astronomical Texts*, Otto Neugebauer and Richard Parker, Brown University Press, USA, 1960-7.
5. *Ibid.*, Vol. I p. 25.
6. *The Gods of the Egyptians*, London, 1904, Vol. II, p. 114.
7. *Ibid.*, Vol. II, p. 113.
8. *Ibid.*, Vol. II, p. 117.
9. *Ibid.*, Vol. II, p. 215.
10. *Ibid.* Vol. I, pp. 202-3.
11. *Ibid.* Vol. II, p. 264.
12. *Ibid.* Vol. II, p. 265.
13. *Ibid.* Vol. II, p. 139.
14. Neugebauer and Parker, *op. cit.*
15. *Star Names, Their Lore and Meaning*, R. H. Allen, Dover Publications, New York, 1963, p. 130.
16. Neugebauer and Parker, *op. cit.*
17. *Star Names, Their Lore and Meaning*, p. 68.
18. *Ibid.*, p. 65.
19. *Ancient Near Eastern Texts relating to the Old Testament*, ed. by James B. Pritchard, Princeton University Press, USA, 1955, p. 33.
20. *Ibid.* p. 4.
21. Alexander Heidel, *The Babylonian Genesis*, University of Chicago Press, USA, 1965, p. 86.
22. Wallis Budge, *op. cit.*, Vol. I, p. 284.
23. *Ibid.* Vol. I, p. 290.
24. *Ibid.* Vol. II, p. 154, and Vol. I, p. 446.
25. *Ibid.* Vol. I, p. 154.
26. *Ibid.* Vol. II, p. 26.
27. *Ibid.* Vol. II, pp. 264-5.
28. *Ibid.* Vol. II, pp. 195-200.
29. *Ibid.* Vol. II, pp. 264-5.
30. 'Isis and Osiris', Loeb edition, p. 107.
31. *Ibid.* p. 145.
32. *Ibid.* p. 39.
33. *Ibid.* p. 147.



34. *The Oracles of Zeus*. H. W. Parke, p. 13
35. *Three Greatest Hermes*, G. R. S. Mead, John Watkins, London, 1964
36. *Ibid.*, Vol. III, p. 95. He quotes from Wessley, *Danksche d. h. Akad* (1893), p. 37, l. 500.
37. See *Imhotep, the Vizier and Physician of King Zoser and afterwards the Egyptian God of Medicine* by Jameson B. Hurry, Oxford University Press, 1926
38. I. E. S. Edwards, *The Pyramids of Egypt*, Penguin, 1970
39. Hurry, *op. cit.*, p. 20.
40. *Ibid.*, p. 40.

## SUMMARY

Sirius was the most important star in the sky to the ancient Egyptians. The ancient Egyptian calendar was based on the rising of Sirius. It is established for certain that Sirius was sometimes identified by the ancient Egyptians with their chief goddess Isis.

The companion of Isis was Osiris, the chief Egyptian god. The 'companion' of the constellation of the Great Dog (which includes Sirius) was the constellation of Orion. Since Isis is equated with Sirius, the companion of Isis must be equated, equally, with the companion of Sirius. Osiris is thus equated on occasion with the constellation Orion.

We know that the 'companion of Sirius' is in reality Sirius B. It is conceivable that Osiris-as-Orion, 'the companion of Sirius', is a stand-in for the invisible true companion Sirius B.

'The oldest and simplest form of the name' of Osiris, we are told, is a hieroglyph of a throne and an eye. The 'eye' aspect of Osiris is thus fundamental. The Bozo tribe of Mali, related to the Dogon, call Sirius B 'the eye star'. Since Osiris is represented by an eye and is sometimes considered 'the companion of Sirius' this is equivalent to saying that Osiris is 'the eye star', provided only that one grants the premises

that the existence of Sirius B really was known to the ancient Egyptians and that 'the companion of Sirius' therefore could ultimately refer to it

The meanings of the Egyptian hieroglyphs and names for Isis and Osiris were unknown to the earliest dynastic Egyptians themselves, and the names and signs appear to have a pre-dynastic origin which means around or before 3200 BC, in other words 5,000 years ago at least. There has been no living traditional explanation for the meanings of the names and signs for Isis and Osiris since at least 2800 BC at the very latest

'The Dog Star' is a common designation of Sirius throughout known history. The ancient god Anubis was a 'dog god', that is, he had a man's body and a dog's head.

In discussing Egyptian beliefs, Plutarch says that Anubis was really the son of Nephthys, sister to Isis, although he was said to be the son of Isis. Nephthys was 'invisible'. Isis was 'visible' (In other words, the visible mother was the stand-in for the invisible mother, who was the true mother, for the simple reason that the invisible mother could not be perceived.)

Plutarch said that Anubis was a 'horizontal circle, which divides the invisible part — which they call Nephthys, from the visible, to which they give the name Isis; and as this circle equally touches upon the confines of both light and darkness, it may be looked upon as common to them both.'

This is as clear an ancient description as one could expect of a circular orbit (called 'Anubis') of a dark and invisible star (called 'Nephthys') around its 'sister', a light and visible star (called 'Isis') — and we know Isis to have been equated with Sirius. What is missing here are the following specific points which must be at this stage still our assumptions: (a) The circle is actually an orbit. (b) The divine characters are actually stars, specifically in this context.

Actually, Anubis and Osiris were sometimes identified

with one another Osiris, the companion of Isis who is sometimes 'the companion of Sirius' is also sometimes identified with the orbit of the companion of Sirius, and this is reasonable and to be expected.

Isis-as-Sirius was customarily portrayed by the ancient Egyptians in their paintings as travelling with two companions in the same celestial boat. And as we know, Sirius does, according to some astronomers, have two companions, Sirius B and Sirius C.

To the Arabs, a companion-star to Sirius (in the same constellation of the Great Dog) was named 'Weight' and was supposed to be extremely heavy – almost too heavy to rise over the horizon. 'Ideler calls this an astonishing star-name,' we are told, not surprisingly.

The true companion-star of Sirius, Sirius B, is made of super-dense matter which is heavier than any normal matter in the universe and the weight of this tiny star is the same as that of a gigantic normal star.

The Dogon also, as we know, say that Sirius B is 'heavy' and they speak of its 'weight'.

The Arabs also applied the name 'Weight' to the star Canopus in the constellation Argo. The *Argo* was a ship in mythology which carried Danaos and his fifty daughters to Rhodes. The *Argo* had fifty oarsmen under Jason, called Argonauts. There were fifty oars to the *Argo*, each with its oarsman Argonaut. The divine oarsman was an ancient Mediterranean motif with sacred meanings.

The orbit of Sirius B around Sirius A takes fifty years, which may be related to the use of the number fifty to describe aspects of the *Argo*.

There are many divine names and other points in common between ancient Egypt and ancient Sumer (Babylonia). The Sumerians seem to have called Egypt by the name of 'Magan' and to have been in contact with it.

The chief god of Sumer, named Anu, was pictured as a

jackal, which is a variation of the dog motif and was used also in Egypt for Anubis, the dog and the jackal apparently being interchangeable as symbols. The Egyptian form of the name Anubis is 'Anpu' and is similar to the Sumerian 'Anu', and both are jackal gods.

The famous Egyptologist Wallis Budge was convinced that Sumer and Egypt both derived their own cultures from a common source which was 'exceedingly ancient'.

Anu is also called An (a variation) by the Sumerians. In Egypt Osiris is called An also.

Remembering that Plutarch said that Anubis (Anpu in Egyptian) was a circle, it is interesting to note that in Sanskrit the word *Anḍa* means 'ellipse'. This may be a coincidence.

Wallis Budge says that Anubis represents time. The combined meanings of 'time' and 'circle' for Anubis hint strongly at 'circular motion'.

The worship of Anubis was a secret mystery religion restricted to initiates (and we thus do not know its content). Plutarch, who writes of Anubis, was an initiate of several mystery religions, and there is reason to believe his information was from well-informed sources (Plutarch himself was a Greek living under the Roman Empire). A variant translation of Plutarch's description of Anubis is that Anubis was 'a combined relation' between Isis and Nephthys. This has overtones which help in thinking of 'the circle' as an orbit — a combined relation between the star orbiting and the star orbited.

The Egyptians used the name Horus to describe 'the power which is assigned to direct the revolution of the sun', according to Plutarch. Thus the Egyptians conceived of and named such specific dynamics — an essential point.

Plutarch says Anubis guarded like a dog and attended on Isis. This fact, plus Anubis being 'time' and 'a circle', suggests even more an orbital concept — the ideal form of attendance of the prowling guard dog.

Aristotle's friend Eudoxus (who visited Egypt) said that the Egyptians had a tradition that Zeus (chief god of the Greeks whose name is used by Eudoxus to refer to his Egyptian equivalent, which leaves us wondering which Egyptian god is meant—presumably Osiris) could not walk because 'his legs were grown together'. This sounds like an amphibious creature with a tail for swimming instead of legs for walking. It is like the semi-divine creature Oannes, reputed to have brought civilization to the Sumerians, who was amphibious, had a tail instead of legs, and retired to the sea at night.

Plutarch relates Isis to the Greek goddess Athena (daughter of Zeus) and says of them they were both described as 'coming from themselves', and as 'self-impelled motion'. Athena supervised the *Argo* and placed in its prow the guiding oak timber from Dodona (which is where the Greek ark landed, with the Greek version of the Biblical Noah, Deukalion, and his wife Pyrrha). The *Argo* thus obtained a distinctive 'self-impelled motion' from Athena, whom Plutarch specifically relates to Isis in this capacity.

The earliest versions of the *Argo* epic which were written before the time of Homer are unfortunately lost. The surviving version of the epic is good reading but relatively recent (third century B.C.).

The Sumerians had 'fifty heroes', 'fifty great gods', etc., just as the later Greeks with their *Argo* had 'fifty heroes' and the *Argo* carried 'fifty daughters of Danaos.'

An Egyptian papyrus says the companion of Isis is 'Lord in the perfect black'. This sounds like the invisible Sirius B. Isis's companion Osiris 'is a dark god'.

The Trismegistic treatise 'The Virgin of the World' from Egypt refers to 'the Black Rite', connected with the 'black' Osiris, as the highest degree of secret initiation possible in the ancient Egyptian religion—it is the ultimate secret of the mysteries of Isis.

## THE SIRIUS MYSTERY

This treatise says Hermes came to earth to teach men civilization and then again 'mounted to the stars', going back to his home and leaving behind the mystery religion of Egypt with its celestial secrets which were some day to be decoded.

There is evidence that 'the Black Rite' did deal with astronomical matters. Hence the Black Rite concerned astronomical matters, the black Osiris, and Isis. The evidence mounts that it may thus have concerned the existence of Sirius B.

A prophecy in the treatise 'The Virgin of the World' maintains that only when men concern themselves with the heavenly bodies and 'chase after them into the height' can men hope to understand the subject-matter of the Black Rite. The understanding of astronomy of today's space age now qualifies us to comprehend the true subject of the Black Rite, if that subject is what we suspect it may be. This was impossible earlier in the history of our planet. It must be remembered that without our present knowledge of white dwarf stars which are invisible except with modern telescopes, our knowledge of super-dense matter from atomic physics with all its complicated technology etc., none of our discussion of the Sirius system would be possible; it would not be possible to propose such an explanation of the Black Rite at all - we could not propound the Sirius question. Much material about the Sumerians and Babylonians has only been circulated since the late 1950s and during the 1960s, and our knowledge of pulsars is even more recent than that. It is doubtful that this book could have been written much earlier than the present. The author began work in earnest in 1967 and finished the original edition of the book in 1974. Even so, he feels the lack of much needed information: sites remain unexcavated, texts untranslated from various ancient languages, astronomical investigations are perpetually incomplete. The author has also found it difficult to master material from so many different fields and wishes

## A FAIRYTALE

he were much better qualified. The Sirius question could not realistically have been posed much earlier, and future discoveries in many fields will be essential to its full consideration. The situation has not greatly changed at the end of 1997.

## CHAPTER FOUR

# The Sacred Fifty

'The Virgin of the World' is quite explicit in saying that Isis and Osiris were sent to help the Earth by giving primitive mankind the arts of civilization

And Horus thereon said

'How was it, mother, then, that Earth received God's Efflux?'

And Isis said

'I may not tell the story of (this) birth, for it is not permitted to describe the origin of thy descent, O Horus (son) of mighty power, lest afterwards the way of birth of the immortal gods should be known unto men — except so far that God the Monarch, the universal Orderer and Architect, sent for a little while the mighty sire Osiris, and the mightiest goddess Isis, that they might help the world, for all things needed them.

'Tis they who filled life full of life 'Tis they who caused the savagery of mutual slaughtering of men to cease. 'Tis they who hallowed precincts to the Gods their ancestors and spots for holy rites. 'Tis they who gave to men laws, food and shelter ' Etc

They are also described as teaching men how to care for the



dead in a specifically Egyptian way: 'Tis they who taught men how to wrap up those who ceased to live, as they should be.'

Now anyone knows this is Egyptian and not Greek practice. What Neoplatonist would include such a statement unless it were actually taken from an early source which he used, and which had been written by someone actually living in Egypt?

The treatise ends this long section with

'Tis they alone who, taught by Hermes in God's hidden codes, became the authors of the arts, and sciences, and all pursuits which men do practise, and givers of their laws.

'Tis they who, taught by Hermes that the things below have been disposed by God to be in sympathy with things above, established on the earth the sacred rites over which the mysteries in Heaven preside. [The absence here of a blatant propaganda for astrology argues a pre-Ptolemaic date for this treatise; after the Greek and Babylonian influx a mild statement like this would have been almost impossible to make without the author dragging in all the paraphernalia of the astrology-craze of late Egypt.]

'Tis they who, knowing the destructibility of (mortal) frames, devised the grade of prophets, in all things perfected, in order that no prophet who stretched forth his hands unto the Gods, should be in ignorance of anything, that magic and philosophy should feed the soul, and medicine preserve the body when it suffered pain.

'And having done all this, my son, Osiris and myself perceiving that the world was (now) quite full, were thereupon demanded back by those who dwell in Heaven.'

And in the treatise Isis claims that the 'Black Rite' honours

her and 'gives perfection'. It is also concerned with the mysterious thing called 'Night' 'who weaves her web with rapid light though it be less than Sun's'. It is made plain that 'Night' is not the night sky because it moves in the Heaven along with 'the other mysteries in turn that move in Heaven, with ordered motions and with periods of times, with certain hidden influences bestowing order on the things below and co-increasing them'.

We must scrutinize the description of what is labelled 'Night' in this treatise. This description makes it perfectly clear that 'Night' is not 'night', but a code word. For it is said to have 'light though it be less than Sun's'. The dark companion of Sirius is a star and has light, though less than the sun. Also 'Night' is said 'to weave her web with rapid light' which specifically describes the object as being in motion. Since Sirius B orbits Sirius A in fifty years, it moves more rapidly even than three of our sun's planets in our own solar system - Pluto, Neptune, and Uranus. Of these three, Uranus is the most rapid, and its orbit about the sun takes eighty-four years. So here is a star orbiting more rapidly than a planet! That may indeed be said to constitute 'weaving a web with rapid light'.

Now to return to the Sumerian culture, or, more properly, the Sumero-Akkadian culture. It was roughly contemporaneous with ancient Egypt and I had already suspected its basic religious concepts to be so similar to those of Egypt that I imagined they might have a common origin. Then I discovered that Wallis Budge thought the same thing from his point of view as a distinguished Egyptologist. I am not aware of any Sumero-logists having dealt with this particular problem. Far more attention has been given to the known trading links which existed between Sumer and the Indus Valley civilization, and also to the problem of deciding where Dilmun was located. (To the Sumerians, Dilmun was on the one hand a real foreign country or region from which

they obtained timber, but on the other hand, it seems to have represented the 'Other World' but *not* the Underworld a 'clean place', 'a pure place', 'a bright place') Kramer thinks Dilmun was the Indus valley, Bibby follows Peter B. Cornwall and thinks it was the island of Bahrein in the Persian Gulf. But to the Sumerians this land, which lay in a direction seemingly other than that of Egypt, had immense importance. Consequently, it has tended to monopolize the attention of modern scholars investigating Sumerian geographical references. Kramer thinks that the land 'Magan' was probably Egypt and that Sargon even sent his armies there.

The basic Egyptian astronomy and the basic Sumerio-Akkadian astronomy are identical. For the multitude of variations at a less basic level, one may consult Professor Otto Neugebauer's *The Exact Sciences in Antiquity*. But Neugebauer's interests lie with late material, as he admits, and he does less than justice to the earlier material, skimming over it quickly and making little of some things which are important. Here is an example of his attitude expressed in his own words near the beginning of Chapter Five: 'Our description of Babylonian astronomy will be rather incomplete. The historical development will be given in bare outline. As in the case of Egypt, a detailed discussion of the few preserved early texts would require not only too much room but would also unduly exaggerate their historical importance. For the late period, however, the opposite situation prevails.' Well, at least Professor Neugebauer is honest about his preferences. We turn to E. A. Speiser's translation of the Akkadian creation epic known as the *Enuma Elish* from the first two words of the text which mean 'When on high . . .'. At the very beginning of this text we read

He constructed stations for the great gods,  
Fixing their astral likenesses as constellations.

## THE SIRIUS MYSTERY

He determined the year by designating the zones

He set up three constellations for each of the twelve months.

After defining the days of the year [by means] of (heavenly) figures,

He founded . . . , etc

In other words, the text gives a system identical with that recorded in the Egyptian star clocks. Twelve months composed of three ten-day weeks each, resulting in thirty-six constellations or 'decans' designating astral likenesses of gods. The text specifically states that there are twelve months consisting of three periods each (unless one strains the point enormously and maintains on no grounds whatsoever that these three periods are unequal, they must be of ten days each

hence 'ten-day weeks' as in Egypt), and that a constellation or 'zone' of the sky applies to each of these 'weeks'. Since three times twelve equals thirty-six, we have thirty-six decans, each of which is 'designated' by a constellation. And also as in Egypt, each decan is an 'astral likeness' of a great god. It is surprising that no scholar has seen that this passage in the *Enuma Elish* describes the Egyptian star-clock system down to the last detail.

No doubt also the five 'epagomenal' days left over in order to fill out this resulting 360-day year to a 365-day year are referred to in the line: 'After defining the days of the year of (heavenly) figures,' which is again identical with the Egyptian tradition where the five left-over days are each assigned to five different gods or heavenly figures and thus defined. In Egypt these five left-over days are called 'the days upon the year'. These five days are also extremely important in Maya astronomy.

We can see that the astronomical systems in Egypt and Sumer were absolutely identical in their fundamentals. Now these similarities between Egypt and Sumer are a far different

matter from similarities of names of gods and religious concepts. One can always maintain that people in different parts of the globe spontaneously produce identical sounds when awe-struck by divine concepts. 'Everybody around the world says "Ma!" to Mother,' as we have all heard many times. But an astronomical system of this kind is a complex set of specific data. The fact that this Akkadian text tentatively dated by Speiser at the Old Babylonian period (i.e. the early part of the second millennium BC) records an astronomical system of this complexity which is identical with that of the Egyptian star clocks can be said to point to either contact between these two civilizations or a common derivation for the system. And it suggests a date which could serve as an upper limit. Culture contact during which this information was shared could not have been any later. Let any latest date accepted for the writing of the *Enuma Elish* serve as an upper limit. If this be done, we find the first millennium BC as the upper limit, even for those who require incontrovertible physical proof. The contact between Egypt and Sumer must have been considerably earlier, if direct, or it may not have been a contact, but rather a common derivation (which was Wallis Budge's favoured idea).

The Egyptian star clocks date from at least the reigns of Seti I (1303-1290 BC) and Ramses IV (1158-1152 BC) of the XIXth and XXth Dynasties respectively, on the walls of whose tombs they are found. Therefore these star clocks are at least as old as 1300 BC and seem to go back to the very origins of Egyptian culture. By the first millennium BC they had been changed and a fifteen-day week substituted for the ten-day week. Other innovations took place as well at later dates, and the system fell into a considerable decay and became, it seems, a relic. I should imagine that a rise in the popularity of the sun god Ra made stars and especially Sirius seem less important. In any case, the innate integrity of the Sirius system in Egypt began to rot away and be ignored by

the first millennium BC., as it was superseded by ideas more obvious and less esoteric to impatient priests. Perhaps when this began to happen some purists may have gone off to other places where they hoped to retain the traditions without interference from decadent Pharaohs. We shall return much later to this idea, with some surprising information.

But let us return to Sumer and continue in hot pursuit. In Tablet VI\* of the *Enuma Elish* we find an interesting passage. In it are mentioned the Anunnaki, who were the sons of An (An means 'heaven'), also known as Anu the great god. These Anunnaki were fifty in number and were called 'the fifty great gods'. Nearly always these Anunnaki were anonymous, the emphasis being on their number and their greatness and their control over fate. No certain identification of any important Sumerian god with any one of the Anunnaki exists except peripherally (as I shall describe later). In fact, all Sumerologists have been puzzled by the Anunnaki. They have not been 'identified' and no one knows exactly what is meant by them. They recur often throughout the texts, which makes it all the more annoying that nowhere are they explicitly explained. But their apparent importance to the Sumerians cannot be questioned.

In an early Sumerian fragment (from a time long before the civilization of the Babylonians) of the material concerning the epic hero Gilgamesh, entitled 'Gilgamesh and the Land of the Living', we find an antecedent to the tradition of the Argonauts of the Greeks. This fragment appears in a translation by Kramer.<sup>2</sup> In fact, I feel it is safe to say that this Sumerian fragment is the earliest known form of the story of that hero who was later to be named Jason. In the story from this fragment, the hero, Gilgamesh, wishes to go to the 'land of the living', which is described as being in the charge of the

\* For those texts which survive on baked clay tablets, it is conventional to refer to Tablet number.

## THE SACRED FIFTY

sun god Utu. In the story of Jason and the Argonauts, the hero, Jason, wishes to search for the golden fleece, which is known to be a solar symbol. In the Sumerian fragment we do find the surprising line: 'The hero, his teeth are the teeth of a dragon.' In the Jason story, the hero, Jason, sows the dragon's teeth! (So does Cadmus in another Greek tale which we shall examine later.)

In the Jason story, Jason is accompanied on his quest by the fifty Argonauts. In the Sumerian fragment, Gilgamesh is accompanied by fifty companions also! Here is the relevant passage (in which Gilgamesh is speaking)

'Who has a house, to his house! Who has a mother to his mother!

'Let single males who would do as I (do), fifty, stand by my side.'

Who had a house, to his house, who had a mother, to his mother,

Single males who would do as he (did), fifty, stood at his side.

To the house of the smiths he directed his step,

The [axe], the [axe], his 'Might of Heroism' he caused to be cast there.

To the [garden of the plain] he [directed] his step,

The [tree], the willow, the apple tree, the box tree, the [tree] he [felled] there.

The 'sons' of his city who accompanied him [placed them] in their hands.

The fifty companions are mentioned several times. The fragmentary text is extremely broken and confused. Further light on the motif of sowing the dragon's teeth seems to come from a passage where Gilgamesh, who had for some unknown reason been asleep, was awakened, girded himself, stood like a bull on the 'great earth' and 'He put (his) mouth to the

ground, (his) teeth shook." Note that it is at least open to question that the mouth and the teeth are actually his, and the word 'his' is both times in parentheses, put thus by the translator. But here is the entire passage:

He put (his) mouth to the ground, (his) teeth shook  
 'By the life of Ninsun, my mother who gave birth to me,  
 of pure Lugulbanda, my father,  
 'May I become as one who sits to be wondered at on the  
 knee of Ninsun, my mother who gave birth to me'

Apart from the fact that Gilgamesh's desire to sit on the knee of his mother, the goddess Ninsun, is similar to Horus sitting on the knee of his mother, the goddess Isis, as a constant motif in Egyptian art, there seems to be here an obscure but significant reference to the fact that if the hero puts his mouth to the ground and his teeth shake, he can invoke a kind of rebirth in strength. I suspect that the translation needs to be worked on further, but it is difficult, as there are so many words in Sumerian whose meanings are not precisely understood. Whether or not it is Gilgamesh's own mouth and teeth that are being discussed here, the fact is that Gilgamesh seeks strength by putting some teeth to the ground – either his or someone else's. As previously in the same tale, there has been the clear statement: 'The hero, his teeth are the teeth of a dragon', we may assume that Gilgamesh's own teeth are probably being referred to – *his own teeth which have previously been described as being dragon's teeth!*

Now in the lines following the putting of the teeth to the ground, we learn that Gilgamesh needs to summon strength by putting his teeth to the ground because he needs to fight. In the story of the *Argo*, Jason sows the dragon's teeth in the ground, and from them spring up armed soldiers who begin to fight – as is also the case in the story of Cadmus, legendary king of Greek Thebes, born at Tyre (see later, pp. 346–53 and



Figure 42). So we see that in the two Greek myths, as also in this Sumerian fragment, the dragon's teeth go to the ground and a fight ensues where the hero has acquired superhuman strength. Later in this book we shall see the precise explanation of where this curious jumble originated, that it is specifically derived from an Egyptian sacred pun, and what it all means.

Meanwhile we must stay at our present level of enquiry. This book is an anabasis, or journey upward.

Let us look a little closer at the story of Jason and the golden fleece. The golden fleece was given to Phrixus and Helle by the god Hermes. The Egyptian god Anubis became known to the Greeks as their own Hermes. Furthermore, the first-century-BC Greek historian Diodorus Siculus (IV, 47), and Tacitus, the first-century-AD Roman historian (*Ann.* VI, 34), explain the golden fleece's origin by saying that Phrixus and Helle (who flew away on the golden ram's back to Colchis, Helle falling in the Hellespont on the way and giving that body of water its name) really sailed in a ship with a ram's head on the prow, rather than having ridden on the magical ram of the story. The fact that the more widespread myth which had an actual ram in the story maintained specifically that they *flew* on the golden ram, could refer to the idea of a celestial boat.

In any case, this boat would definitely have been a boat of Egypt, which to the Sumerians would have been called a 'Magan-boat', if we accept what Kramer and others believe, namely, that Magan is Egypt. And the boat was a 'gift from Hermes' – in other words from Anubis. No wonder, then, that the Sirius-related fifty is connected with the golden fleece as well as Anubis. It is worth mentioning also that the fifty Argonauts were also called the Minyae, as they were all related to each other and of the same family, descended all of them from Minyas, who had been the king of the Minyan city of Orchomenos in Boeotia, in Greece. So Jason and the

Argonauts, fifty in number, all shared a kind of shadowy anonymity somewhat reminiscent of the fifty Arannai of Sumner, as they were often referred to simply as 'the Minyae'

a group of fifty related oarsmen in a celestial boat. The 'fifty' were eventually given personalities by later writers such as Apollonius Rhodius, as I shall discuss later.

Later on we shall look extremely closely at the *Argo* story and also at the connections between the land Colchis, the object of its quest, and ancient Egypt, as attested for us by the historian Herodotus. But we must complete our look at the story of Gilgamesh and the Land of the Living. For even a boat is mentioned in that fragment, corresponding to the *Argo*. My equating a moment ago of the *Argo* with an Egyptian celestial barque must now be seen in conjunction with the following passage in which Gilgamesh's boat is specifically referred to as the 'Magan boat'. I might add that the trees which Gilgamesh cut down and which his fifty companions 'placed in their hands' according to the text were probably their oars! (The text is too broken for anything at all to be certain, even punctuation, among the fourteen lines which follow that particular passage.) Here, then, is the passage about the boat.

'For me another will not die, the loaded boat will not sink,  
The three-ply cloth will not be cut,  
The      will not be overwhelmed,  
House (and) hut, fire will not destroy.  
Do thou help me (and) I will help thee, what can happen  
to us?

After it had sunk, after it had sunk,  
After the Magan boat had sunk,  
After the boat, "the might of Magilum", had sunk,  
In the      the boat of the living creatures, are seated  
those who come out of the womb,  
Come, let us go forward, we will cast eyes upon him,

If we go forward,  
 (And) there be fear, there be fear, turn it back,  
 There be terror, there be terror, turn it back,  
 In thy . . . come, let us go forward.'

I must emphasize that there is confusion here. In a footnote Kramer emphasizes that from the line 'After it had sunk' it is no longer certain that Gilgamesh is still speaking. It is not clear whether the Magan-boat has really sunk or whether this is a statement injected by Gilgamesh's 'faithful servant' who immediately before the passage just quoted had told Gilgamesh

'O my master, journey thou to the "land", I will journey  
 to the city,  
 I will tell thy mother of thy glory, let her shout,  
 I will tell her of thy ensuing death, [let her] shed bitter  
 tears.'

What seems to happen is that Gilgamesh here tells his frightened servant (who just previously in the text is described as 'terror-stricken') that no other will die for him and that 'the loaded boat will not sink'. Then the servant would seem to break in again in his terror with his hypothetical tale to Gilgamesh's mother with 'After it had sunk . . .'. Then Gilgamesh again speaks, beginning with, 'Come, let us go forward . . .'

The phrase 'those who come out of the womb' to describe those who are seated in the Magan-boat may be meant to refer to those who are children of the goddess Nintu, also known as Ninmah, Ninhursag, and Ki 'earth'. This, combined with the strange reference to teeth ('His teeth shook' see page 176), seems to refer to the children of the earth-goddess springing from the womb of the earth for Ki, the earth-goddess (*ki* means 'earth' in Sumerian) is a so Nintu or 'the

goddess who gives birth' (Ninmah means 'the great goddess' and Ninhursag means 'the goddess of the hill', a *hursag* or hill having been erected by her son — and she was named after it by him in commemoration of a significant mythical event, in Egypt Anubis is also called 'Anubis of the Hill', about which I shall have much to say later on, but suffice it here to note that if the Sumerians were to speak of 'Anubis of the Hill' they would call him Anpu-hursag.)

Basically in the goddess who gives birth, and also in the earth-goddess, we thus find antecedents to the soldiers springing up from the dragon's teeth sown in the earth, and also the throwing over his shoulder of the 'earth's bones' (stones) by Deukalion, the Greek Noah, with the stones becoming men much as the teeth did in the other stories (And teeth are bones')

In fact there are several points of contact other than this one between the Deukalion and Jason stories. For the ark of Noah is a concept which is identical with that of the ark of Deukalion, and both are magical ships in which sit 'those who come out of the womb', in the sense that they repopulate the world after the deluge. And both arks, but particularly that of Deukalion, are concepts related to the *Argo* (As anyone who has read the full *Epic of Gilgamesh* will know, the ark of Noah in the Middle East before either the Hebrews or the name Noah even existed, was the ark of Ziusudra or the ark of Utnapishtim, and it occurs as an established element of the mythical background brought into the *Epic*.) For the ark of Deukalion rested on the mountain by the sacred oracle grove of Dodona, from which the *Argo* received its cybernetic guiding timber. Also, of course, the origin of the story of the flood and the ark (containing as it does 'archetypes' of all living creatures in pairs, and the word *archē* in Greek being definitely related to *ark*, as we shall see much later in this book) is Sumerian at least, if not even before that something else (which we shall also see in due course). But it was from

this early source that the Greeks obtained their Deukalion and the Hebrews their Noah — both of which are extremely late forms of an exceedingly ancient story, which existed thousands of years before there were such things as either Greeks or Hebrews in existence. (Anyone really interested in the origins of Greek and Hebrew civilizations should read Professor Cyrus Gordon's brilliant book *The Common Background of Greek and Hebrew Civilizations*.<sup>3</sup>)

Now the point of going into all this is really to show that the Argonaut motif of fifty heroes in a boat on a heroic quest exists in Sumer and forms a complement to the 'fifty great gods'. For if the Magan-boat's fifty heroes are seated, as the Anunnaki usually are, and are 'those who come forth out of the womb', and thus children, so to speak, of Nintu, 'the goddess who gives birth', then they may be directly equated with the Anunnaki. For the Anunnaki, as the children of An, would also be the children of An's ancient consort Ki or Nintu. In other words, the fifty heroes are heroic counterparts of the celestial Anunnaki. The corollary of this is, that the fact that there are fifty Anunnaki is not so likely to be a coincidence as might have been thought. This brings out all the more the immense significance of the number fifty.

The number occurs also in 'Gilgamesh, Enkidu, and the Nether World'. There Gilgamesh dons armour which weighs 'fifty minas'. And in this tale also Gilgamesh has fifty companions. In the later Babylonian version the fifty companions are omitted from the story. At that date the true nature of the symbolism of fifty must have been forgotten.

In his book *The Sumerians*, Kramer points out<sup>4</sup> that cultic and symbolic weapons, maces with fifty heads, were fashioned by the ruler Gudea (circa 2400 BC).

If we return for a moment to the intriguing *hursag* of the Sumerians, the strange 'h.l.', we must recall that Ninhursag the goddess of the h.l. is identical with Nintu the goddess who gives birth. Those are two separate names for the same

deity. Now it is interesting to note that in Egyptian the word *tu* means 'hill', so that if we take the word *nut* which means 'goddess' and add the Egyptian *tu* we have 'the goddess of the hill', which in fact is a synonym.

This is by no means the end of this interesting investigation. For if we note that the Egyptian form of Horus (the son of Isis and Osiris) is Heru (which is a bit like Hero, isn't it?) and the traditional usage in Egyptian is to speak continually of Heru *sa-something* which means Horus-the-son of *something*, then we shall note that the strange and puzzling word *hursag* might really be the Egyptian Heru *sa-Agga*, which means 'Horus the son of Agga'. It so happens that Agga is an Egyptian synonym for Anubis. And 'Anubis of the Hill' has already been mentioned. What is more, the word *hursag* in its older Sumerian form is indeed *hursagga*, as may be seen in *The Babylonian Genesis*, Chapter Two, by Alexander Heidel, 'A Sumerian Creation Account from Nippur', where we read of the goddess Ninhursagga.

It also happens that Agga is in fact a reputable Sumerian name. There is in translation a short 115-line text entitled 'Gilgamesh and Agga' from the Sumerian period.<sup>5</sup> In line eighty of this text is the mention of a 'magurru-boat', which is referred to in much the same way as the Magan-boat in 'Gilgamesh and the Land of the Living'. Just as in that previous text the Magan-boat was being discussed as to whether or not it would sink, so in this latter text the *magurru-boat* is being discussed as to whether or not it would have its prow cut down. Curiously, as in the other tale, in this one also the boat is described as having had the worst fate actually occur, for in line ninety-eight we learn that 'the prow of the *magurru* boat was cut down', just as in the previous text we read 'After the Magan-boat had sunk, / After the boat, "the might of Magilum", had sunk.'

The connections between Egyptian and Sumerian words in sacred contexts become so multifold that it is impossible to

ignore the continuities between the two cultures. Let us look, for instance, at the curious phenomenon of the cedar which Gilgamesh is always being claimed to have cut down. In 'Gilgamesh and the Land of the Living' Gilgamesh says: 'I would enter the land of the cut down cedar' and later he is described as he 'who felled the cedar', etc. That is an early Sumerian text. In the actual *Epic* proper, as we have it, Gilgamesh goes to the Cedar Mountain and slays the monster Humbaba (or Huwawa) in 'the cedar mountain, the abode of the gods'. In the Fifth Tablet we read:

Gilgamesh gripped the axe  
And with it felled the cedar  
Huwawa, hearing the sound of this,  
Fell into a fury and raged  
'Who is it who has come  
Come, and interfered with my trees?  
My trees which have grown on my own mountains?  
And has also felled the cedar?'<sup>6</sup>

In Chapter 22 of *Hamlet's Mill*, Santillana and von Dechend identify Huwawa with the planet Mercury. Now, remembering that Huwawa is also the god of the cedar forest, it is interesting to note that in Egyptian the word *seb* means 'cedar' and also means 'the planet Mercury'. The subject is far more complicated than that, but I wanted to note the further source of an Egyptian pun for yet another crucial Sumerian motif. In other words, Huwawa is connected with both Mercury (the planet) and the cedar, because the planet Mercury and the cedar are both called by the same name in Egyptian: namely *seb*.

Let us now put aside the enigmatic monster-god Huwawa and turn to the *Epic of Gilgamesh* for another purpose. But in doing so let us note Kramer's opinion in his essay 'The *Epic of Gilgamesh* and Its Sumerian Sources',<sup>7</sup> that 'the poem was

## THE SIRIUS MYSTERY

current in substantially the form in which we know it, as early as the first half of the second millennium B.C.

Let us recall that, in an early Sumerian fragment, Gilgamesh's mother was the goddess Ninsun 'who is versed in all knowledge', and upon whose knee he wanted to sit (like Horus on the knee of Isis). In the First Tablet we read

And so Gilgamesh rose from his bed  
And to his mother, in revealing his dreams, said  
'Mother, I saw in a dream last night  
That there were stars in heaven  
And a star descended upon me like unto  
The essence of Anu who is God of the Firmament.  
I tried to lift it up but it was too heavy for me  
I tried to move it away but it would not be moved  
The land of Uruk was around it,  
The land was placed round about it  
All the people were pressing towards it,  
All the nobles also came round it,  
And all my friends kissed its feet  
I was drawn towards it as to a woman  
And laid it at your feet  
And you said it was my equal'<sup>8</sup>

There is another version of this at the beginning of Tablet II in the Old Babylonian version which is older than the above Assyrian version and preserves more of the original significance

And so Gilgamesh arose from his bed  
And to his mother, in revealing his dreams, said  
'Mother, in the time of night  
I was joyful, I walked about  
In the midst of the nobles  
The stars assembled themselves in the heavens



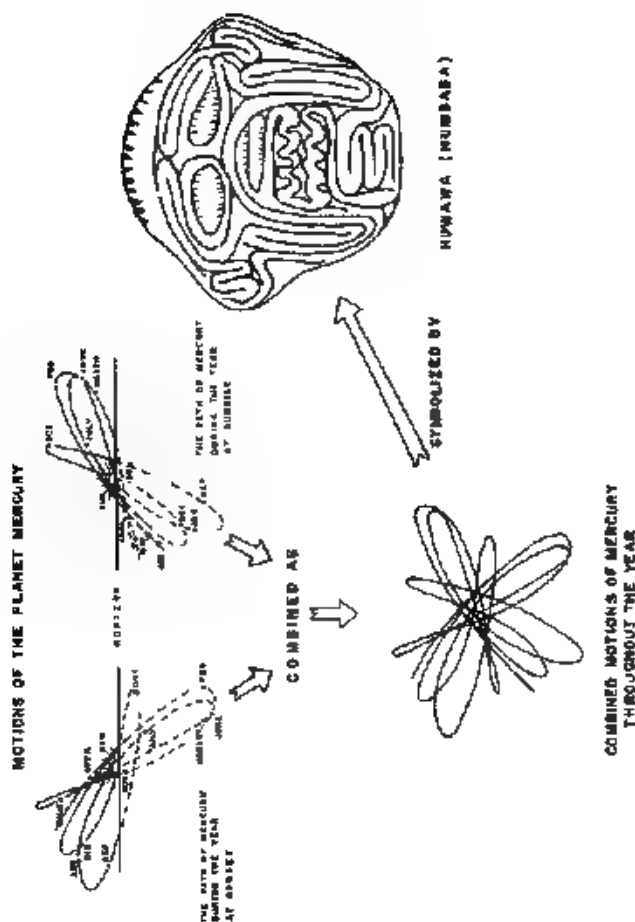


Figure 16. Drawing from ancient terra cotta mask in the British Museum, Huwawa's face consisting of a labyrinth of convoluted intestines

The star-essence of Anu descended towards me  
 I tried to lift it up but it was too heavy for me!  
 I tried to move it away but it would not be moved!  
 The land of Uruk was around it,  
 The land was placed round about it  
 All the nobles also came round it  
 And they kissed its feet.  
 As the strap strained against my forehead,  
 I pulled it, and they supported me  
 I raised it and brought it to you.<sup>4</sup>

Kramer translates the two versions somewhat differently.<sup>10</sup> One of the most important changes occurs in his translation of what Heidel (another modern scholar) before him had rendered as 'the host of heaven'.<sup>1</sup> Kramer renders '*An*' not as 'heaven' but as An (or Anu), the god who was the father of the Anunnaki. And the word which Heidel renders as 'host' he comments on in a footnote at considerable length

As regards *ki-sir*, there are too many possible meanings. Furthermore, the one adopted for this passage ('the *ki-sir* of Ninurta' earlier than our passage) should also apply to the war god Ninurta, and the sky god Anu, Enkidu, and something that fell down from heaven. The common assumption that the author may have used in these passages the same term in more than one sense is unsatisfactory.

In the earlier edition I tried to justify for *kyru* the rendering 'liegeman' for the several passages in question. I now withdraw that suggestion. The correct sense, I believe, is indicated by the use of the term in medical contexts as 'concentration, essence'.<sup>\*</sup> 'Essence', or some nuance of this term, could well be applied to deities as

<sup>\*</sup> cf. E. Ebeling, *Journal of Cuneiform Studies*, IV (1940), 219.

we I as to missiles from heaven. Our poet had in mind, no doubt, some specific allusion, but the general meaning appears clear enough

Kramer, then, renders 'the host of heaven' as 'the essence of An'. He says, 'Like the essence of Anu it descends upon me. He adds another footnote to comment on the word 'it' in this sentence: 'One of the stars?'

Kramer also changes the last lines in the first version.

'[I] was drawn to it as though to a woman.  
And I placed it at [thy] feet,  
For thou didst make it vie with me '

The emphasis here on being 'drawn to it' may be important. He continues.

[The wise mother of Gilgamesh, who] is versed in all  
knowledge,  
Says to her lord,  
[Wise Ninsun] who is versed in all knowledge  
Says to Gilgamesh  
'Thy rival, the star of heaven,  
Which descended upon thee like [the essence of Anu],  
[Thou didst seek to lift it], it was too stout for thee,  
[Thou wouldst drive it off], but couldst not remove it;  
[Thou didst place] it at my feet,  
[For it was I who made] it vie with thee,  
Thou wert drawn to it as though to a woman \*'

Let us look once again at part of the second version, this time as Kramer gives it. <sup>2</sup>

\* With these Tablet texts, sections broken off the clay tablets or now illegible have been filled in by Kramer, hence the frequent square brackets

'My mother, in the time of night  
 I felt joyful and I walked about  
 In the midst of the nobles  
 The stars appeared in the heavens  
 The essence of Anu descended towards me  
 I sought to lift it, it was too heavy for me!  
 I sought to move it, move it I could not!'

All this, which we have examined here in two translations each of two versions, was worth seeing from these several angles. It helps us cover all the possibilities of meaning. The reference is clearly to a star connected with 'the essence of Anu' which 'draws him towards it' and is in the area of the (fifty) heroes — and is super-heavy.

Thus we see that in Sumer both the concepts of the heavy star (later *al Wazn*) and of the figure 'fifty' associated somehow with that star are present. Does this look familiar?

In Tablet VI of the *Enuma Elish* we read<sup>13</sup> about the Anunnaki and something called 'the Bow Star' which is their brother and is in the midst of them as they are seated in the celestial regions. This Bow Star is also the daughter of Anu, who raises it up in their midst (Remember 'the essence of Anu') What is being referred to seems to be SIRIUS. Remember the Egyptian goddess Sati (or Satis) with her bow, who was one of the three goddesses (one was Sothis and the third was Anakis) riding in the celestial barque of Sothis (Sirius). Also recall the other connections of the bow with Sirius, even in China (Here one must refer to *Hamlet's Mill*, for many examples.<sup>14</sup>) Now with particular reference to the three goddesses which Neugebauer claims are versions of Sothis ('The goddess Satis, who like her companion Anakis is hardly to be taken as a separate constellation but rather as an associate of Sothis'), note the following emphasis on three names for the star, only one of which is 'Bow Star'

## THE SACRED FIFTY

The fifty great gods took their seats.  
The seven gods of destiny set up the three hundred [in  
heaven]  
Enlil raised the bow, his weapon, and laid (it) before  
them  
The gods, his fathers, saw the net he had made  
When they beheld the bow, how skilful its shape,  
His fathers praised the work he had wrought  
Raising (it), Anu spoke up in the Assembly of the gods,  
As he kissed the bow "This is my daughter"  
He mentioned the names of the bow as follows.  
'Longwood is the first, the second is [     ],  
Its third name is Bow-Star, in heaven I have made it shine.  
He fixed a place which the gods, its brothers, [     ]

A footnote says of the word 'its' in the last line 'Referring to the Bow, as indicated by the feminine possessive prefix in line 94' (In Egyptian the word *Sept*, which is the name of the star Sirius, also has the meaning 'a kind of wood', though whether this could be 'longwood' or not is anyone's guess.) We continue:

After Anu had decreed the fate of the Bow,  
And had placed the exalted royal throne before the gods,  
Anu seated it in the Assembly of the gods.

The phrase 'the Assembly of the gods' invariably refers to the seated assembly of the fifty Anunnaki. So it is clearly stated, we see, that this 'Bow Star' the daughter of An was placed by An on the exalted royal throne in the midst of the fifty Anunnaki. In Egypt Isis as Sothis was also pictured as seated on a white royal throne in the heavens. She too was the daughter of the sky god. Recall also that the hieroglyph for Ast (or Isis) is a throne. And the hieroglyph for her husband Asar (or Osiris) is a throne above an eye.

Before proceeding, we had better see who 'the seven gods of destiny' are. They are often referred to as the seven Anunnaki of the underworld. This, we shall see, also relates to the Sirius question. But the use of Anunnaki in this way underscores the total anonymity of the term 'Anunnaki.' None of these seven Anunnaki is ever identified as an individual god. They are always 'the seven' underworld gods who determine destiny. The strictly celestial Anunnaki are also known as the Igigi (the precise meaning of which is unknown). No Sumerologist has satisfactorily explained all this. It is terribly imprecise and confusing—unless one had a structure to supply which fits under the cloth and matches the contours and can thereby be accepted as a tentative basis of explanation.

Now let us try to think of what we know is connected with the celestial Anunnaki and Sirius which also fits into this idea of there being seven Anunnaki gods in the underworld. Remember that in both Sumer and Egypt each god of significance in astronomical terms has his own ten-day period or 'week'. If we multiply seven (gods) times ten days we get seventy days. Is there any basis for this length of time being of significance for the underworld in either Sumer or Egypt?

Parker and Neugebauer say:<sup>5</sup> 'It is here made clear that Sirius (Sothis) gives the pattern for all the other decanal stars. Sirius was, astronomically, the foundation of the entire Egyptian religious system. Its celestial movements determined the Egyptian calendar, which is even known as the Sothic Calendar. Its heliacal rising marked the beginning of the Egyptian year and roughly coincided with the flooding of the Nile. (Plutarch says the Nile itself was sometimes called Sirius.) This heliacal rising was the occasion of an important feast. One can imagine a kind of New Year-cum-Easter. The heliacal rising was the occasion when Sirius again rose into visibility in the sky *after a period of seventy days of being out of sight*, during which time it was conceived as being in the

Duat, or underworld. A further connection with Anubis comes in here, as Anubis was conceived of as embalming Sothis for these seventy days in the Duat. An embalmed mummy is supposed to come alive again. And this is what happens to the mummy of Sothis. Sothis is reborn on the occasion of her heliacal rising. Parker and Neugebauer also say: <sup>6</sup> 'During the entire time of its purification it (Sothis, the star) was considered dead and it was only with its rising again out of the Duat that it could once more be considered as living'.

The Egyptians stubbornly clung to the traditional seventy days as the prototype of an underworld experience, despite its inconvenience, and, as we have already seen, 'Sirius gives the pattern for all the other decanal stars'. In fact, it was the practice through all of Egyptian history for there to be a period of precisely seventy days for the embalming of a human mummy in imitation of Sirius. Even during the late Ptolemaic period, the embalming process invariably lasted the precise period of seventy days.

Thus we find the explanation of the seven Anunnaki of the underworld! It is also interesting to note that in Mexico before the Spanish Conquest the underworld was thought to have seven caves.

It is worth noting too the Sumerian story *Etana*,<sup>1</sup> about the legendary King Etana. He was an early Sumerian ruler, a shepherd king who was said to have ruled for 1,560 years. Etana was supposed to have lived in the early third millennium B.C., not long after the Great Flood. He had to ascend to heaven in order to have infertility treatment! As a result he was able to have a son and heir when he returned to Earth. This tale mentions 'the divine Seven' and describes them specifically as Igigi. This emphasises the apparent interchangeability of the terms Igigi and Anunnaki. In the same tale, the great Anunnaki are described as 'They who created the regions, who set up the establishments'.

In the 'Descent of Ishtar to the Nether World' (a long poem which survives in both the Sumerian and Akkadian languages)<sup>18</sup> the Anunnaki are described as being brought forth (they are referred to as if they were stuffed animals being brought out of a closet, dusted off, and displayed in a taxidermists' contest) and seated on thrones of gold. Once more the throne concept appears. It seems all the Anunnaki ever do is sit and be symbolic.

Good little Anunnaki, like poodles, sit and smile at Anu. They are never given personalities, poor fellows. I might mention that in this story the nether world is described as having seven gates leading to seven successive rooms (or caves). It is obvious that the period of seventy days during which Sirius was 'in the underworld' to the Egyptians led to a breaking down of the seventy days into ten-day weeks, each with a god, giving seven gods. But these seven gods of the underworld must not have personalities lest there be the distraction of personal qualities to detract from the purely numerical significance of the concept. And of course the seven rooms of the seven gods are successive, leading from 'week' to 'week' until Sirius again rises. So we see yet another essential link between the early Sumerian concepts and the Egyptian concepts.

In later times the god Marduk usurped the central position of the pantheon from all the other gods in Babylon (Marduk was a god of the Semitic Babylonians, not a Sumerian God. His ascendancy came about as a result of the mixture of cultures.) The *Enuma Elish* is largely a description of this process and is basically written to Marduk, telling of his honours. This was quite an innovation, a real centralization of power. 'The black headed people', which is how the Sumerians usually referred to themselves in their writings (when the context is sufficiently pious they meekly call themselves 'the beclouded', it is also interesting to note that the Egyptians were known as 'the *metamorphoses*' or 'the black-



## THE SACRED FIFTY

footed people' to the Greeks!) obviously didn't take to the rise of Marduk with unanimous acclaim. In many ways the *Enuma Elish* is a blatant propaganda tract for Marduk, alternately trying to convert and to denounce the people. Here we see the author trying to woo them.<sup>49</sup>

Let his sovereignty be surpassing having no rival.

May he shepherd the black-headed ones, his creatures.

To the end of days, without forgetting, let them acclaim  
his ways.

Here, however, we see a more authoritarian approach, where the sugary smile dissolves.

May he order the black-headed to revere him],

But the next moment, compromise comes again in the form of a mock-tolerance:

Without fail let them support their gods!

Their lands let them improve, build their shrines,

Let the black-headed people wait on their gods.

In other words, the author despairs and goes into a sulk. For his next words indicate the sentiment, 'We don't need them, we'll go it alone'.

As for us, by however many names we pronounce it, he is  
our god!

Let us then proclaim his fifty names!

In other words, the supporters of Marduk thought the best way to glorify their god was to give him fifty names. Then, with any luck, he would be omnipotent.

## THE SIRIUS MYSTERY

As Marakka, Marduk 'gladdens the heart of the Anunnaki, appeases their [spirits]' All the fifty names are given, along with short comments following each. In a footnote Speiser says, revealingly, that. The text etymologizes the names in a manner made familiar by the Bible, the etymologies, which accompany virtually every name on the long list are meant to be cabalistic and symbolic rather than strictly linguistic, although some of them happen to be linguistically sound'

The list ends and we read in the text:

With the title 'Fifty' the great gods

Proclaimed him whose names are fifty and made his way supreme

This final note adds a last flourish of emphasis to the importance to the supreme god of the title 'Fifty' as well as the designation by fifty names

There is one cluster of names among the fifty given which is of particular interest. They are Asaru, Asaruum, Asarualimnunna, and the group of three centred round the similar name Asaruladu (the other two being Namullaku and Namru.) I suspect these names of being related to the Egyptian Asar (Osiris). We have already seen how the An of Egypt was known in Sumer not only as An but as Anu, picking up a 'u' ending. It is therefore not so senseless to see in Asaru a Sumerian form of Asar, with the same 'u' ending added. But the Egyptians themselves also had an Asaru or more precisely, an Asar-uu, whom Wallis Budge describes as a form of Osiris worshipped in lower Egypt.

Since Asaru in Sumer corresponds to Asar-uu in Egypt, what about the Sumerian Asaruladu? In Egyptian a vegetative Osiris would be known as Asar-rutu but the liquid 'r' and 'l' are in Egyptian entirely interchangeable (this is a linguistic commonplace and the contemporary Chinese do

this when speaking English) and represented by the same hieroglyph. So Asar-rutu could just as well be Asar-lutu, and the lingual 'r' as opposed to a dental 't' is pronounced rather like a 'd', being a softer sound. If we merely transliterate it thus, we have Asar ludu. It would mean, 'Osiris of the growing plants'. And in fact, in the Sumerian text, we find Asaru described as 'bestower of cultivation—creator of grain and herbs, who causes vegetation to sprout'.

Immediately after one of the Asaru-names of Marduk in the *Enuma Elish* we find that his thirteenth name is Tutu. It so happens that Tutu is the name of an Egyptian god. Wallis Budge describes him as 'a lion-god, son of Neith'. (Wallis Budge says that Neith was: 'One of the oldest goddesses of Egypt. She was the goddess of hunting and weaving, but was identified with many other goddesses such as Isis, Meht-urt, and their attributes were assigned to her'.<sup>20</sup>) There is even an Egyptian precedent for the use of Tutu as one name of a god who has many names. The Egyptian monster of darkness, Apep, 'possessed many names, to destroy him it was necessary to curse him by each and every name by which he was known. To make quite sure that this should be done effectively, the Papyrus of Nes-Amisu adds a list of such names, and as they are the foundation of many of the magical names met with in later papyri they are here enumerated'.<sup>21</sup> And one of these is Tutu. Surely this almost identical pre-occupation with the need to enumerate every one of the magical names of a god in both countries must have common origins—especially as the name *Tutu* is in the lists of both countries.

It is important to look even closer at the Egyptian god Tutu. In Heidel's translation of the *Enuma Elish* he gives for Asaruludu the early Sumerian epithet *namshub* as opposed to the late Babylonian form *namru*—both meaning 'bright', and in the text further explained as, 'The bright god who brightens our way'. In a footnote Heidel explains 'The poets

are here apparently playing on the Sumerian term *shuba*, which is equated with the Babylonian words *ebbu*, *eltu*, and *namru*, all of which mean "bright".<sup>1</sup> Now, what is so interesting is that in Egyptian the word *shu* means 'bright' and also describes the sun god—who is indeed a 'bright god who brightens our way'. So we see that *shu* in Egyptian means the same as *shuba* in Sumerian. Furthermore, both are made to apply to a description of the sun. Also the Sumerian *shuba* is made to refer to Asarluhi, and we may now take note of the further surprising fact that the Egyptian god Tutu is, according to W. L. Budge, 'a form of the god Shu, whose symbol was a lion walking'.<sup>22</sup>

So as we examine the material we find an increasingly complex weave of common patterns in Egypt and early Sumer both linguistically and in religion-astronomy. Later in the book we shall see this all reach a meaningful climax.

## POSTSCRIPT (1997)

The mythological motif of 'fifty' is so widespread that Wilhelm Roscher wrote an entire book about it. It is entitled *Die Zahl 50 in Mythos, Kultus, Epos und Taktik der Hellenen und Anderer Völker Besonders der Semiten* (The Number 50 in Myth, Cult, Epic and Tactics of the Greeks and Other Peoples, in Particular the Semites).<sup>23</sup> In his learned survey, Roscher discusses the fifty daughters of Danaos (the Danaids), the fifty sons of Aegyptus, the fifty Argonauts, the fifty daughters of Nereus, the various fifty-headed, fifty-armed, or hundred-headed and hundred-armed monsters, the fifty daughters of Thespius, the fifty sons of Orion, the fifty sons of Priam, the fifty sons of Lykaon, the fifty sons of Pallas, the fifty daughters of Endymion, the fifty heads of the Hydra, the fifty heads of the dog Cerberus, the fifty heads of Typhon, the fifty cows stolen by Hermes from Apollo, and so

on, just to give some of the Greek examples. Roscher's books only came to my notice just before the original publication of this book, so I had no time available to expand my account of the significance of 'fifty' using his extensive material. Now the reprint of this book has come about so suddenly that once again there is no opportunity to do justice to Roscher's material or to many other matters. However, I would call special attention to Roscher's section on the fifty sons of Orion,<sup>24</sup> because Orion is the companion constellation of Sirius and in Egypt was identified with Osiris.

Ultimately the whole point of the constellation Orion is that it is the *visible* companion of Sirius, and as such was a substitute and representative of the *invisible* companion, which is Sirius B. It is therefore extremely important to come across ancient evidence that Orion was said to have 'fifty sons', since that is a clear acknowledgement from antiquity that there was a 'fifty-ish' aspect to the visible companion of Sirius just as there is of the invisible companion, with its orbit of fifty years.

We should never lose sight of the fact that Orion's importance is that of a substitute for an invisible counterpart. The significance of Orion is thus derivative, not intrinsic. Sirius B was represented amongst the stars by the visible substitute of Orion, and was represented in the solar system by a 'local substitute', the planet Mercury.

## Notes

1. In Pritchard, *Ancient Near Eastern Texts*.
2. Also in Pritchard, *ibid*.
3. Pub. by W. W. Norton & Co. New York, 1965. An earlier edition of this book had a different title: *Before the Bible*.
4. *The Sumerians*. University of Chicago Press, 1963. p. 67.
5. Also in Pritchard, *op. cit*.
6. Temple Robert K. G., *He Who Saw Everything. A Verse Translation of the Epic of Gilgamesh*, Rider, London, 1991, p. 45.

## THE SIRIUS MYSTERY

- 7 *Journal of the American Oriental Society*, 64 (1944), p. 1
- 8 Temple, *op. cit.*, p. 11
- 9 Temple, *op. cit.*, p. 13
- 10 Pritchard, *op. cit.*
- 11 Heidel, Alexander *The Gugalmeš Epi and Old Testament Parallels*, University of Chicago Press, USA, 1970.
- 12 Pritchard, *op. cit.*
- 13 *Ibid.* Also see p. 514, Addenda New Text Fragments, in same vol.
- 14 de Santiana, Giorgio. and van Dechend. Hertha. *Hamuz's Mill*. Macmillan & Company Ltd., London, 1969
- 15 *Egyptian Astronomical Texts*, Vol. I, p. 74.
- 16 *Ibid.*, p. 73
- 17 Pritchard, *op. cit.* p. 114
- 18 *Ibid.*, p. 106.
- 19 In Pritchard. *ibid.*
- 20 *Book of the Dead*, trans. by Wallis Budge, p. 176, n.
- 21 Wallis Budge, *The Gods of the Egyptians*, vol. I, p. 326.
- 22 *Ibid.*, vol. I, pp. 463-4
- 23 The book is Vol. 33, No. 5 of the *Abhandlungen der Philologisch-Historischen Klasse der Königl. Sächsischen Gesellschaft der Wissenschaften Leipzig*, 1917
- 24 *Ibid.* pp. 57-9

## SUMMARY

'The Black Rite' concerned something called 'Night' which was apparently an object that moves in heaven along with 'the other mysteries in turn that move in heaven, with ordered motions and periods of times'. It has less light than the sun and it 'weaves a web with rapid light'

Sirius B moves in heaven with ordered motion and period, has less light than our sun, and distinctly weaves a web with its rapid motion, since it revolves round Sirius A in much less time than the planets Uranus, Neptune, and Pluto revolve around our own sun

'Night' may thus refer to Sirius B, just as may 'black Osiris' and 'invisible Nephthys'.

In really early times the basic concepts of Egyptian astronomy and Sumerian astronomy were identical. Later many differences appeared. Authorities on ancient astronomy tend to give short shrift to the earlier times, hence the similarities between the two cultures in this particular field have tended to go unremarked.

In Egypt and Sumer (Babylonia) there were identical systems of dividing the calendar year into twelve months each composed of three weeks which lasted ten days apiece. Each week had a constellation of the night sky associated with it (which in modern parlance we might describe as 'being a kind of zodiac'). Thirty-six of these weeks added up only to 360 days, which was less than a year, so the 365-day year was obtained by adding on five extra days at the end.

Identical systems of such complexity in these two cultures mean that the relationship between Egypt and Sumer must be explored further.

In Sumer the 'fifty great gods' called the Anunnaki were anonymous as individuals and only ever spoken of as 'the fifty great gods' with the emphasis on their number. They were literally restricted to the level of being a numerological cipher. They are continually invoked and are of importance but they never did anything but sit on their thrones and 'be fifty'.

In an early Sumerian tale of their epic hero Gilgamesh, we find him accompanied in his adventures by fifty heroes, reminiscent of the fifty Argonauts who accompanied Jason. 'His teeth are the teeth of a dragon', we are told - reminiscent of Jason sowing the dragon's teeth. And Gilgamesh also puts his teeth to the ground (that much we can gather, but the passage is obscure and he may really be sowing teeth). Each of his fifty heroic companions carries a specially felled tree for the journey - and the only reasonable purpose to go around carrying a tree seems to be that these trees were used as oars, especially as there is an association with a boat. This again is

like the Argonauts. We thus seem to have found a Near Eastern tale from which the tale of the Argonauts was derived two thousand years or so later by the Greeks.

Gilgamesh somehow derives strength from putting his teeth to the ground. In the Greek tale, Jason sows the teeth and they spring up as strong soldiers - another parallel.

Anubis, who is now familiar to us from Egypt, was identified by the Greeks with their own god Hermes (known in Latin as Mercury). Hermes turned the Golden Fleece to gold originally, in the Greek myth. It was this same Golden Fleece that Jason and the Argonauts sought in their quest, and which they succeeded in seizing and taking away with them.

In the early Gilgamesh tale of the Sumerians, Gilgamesh and his fifty proto-Argonauts have some connection with a ship (the text is tantalizingly fragmented) called 'the Magan-boat'. It should be remembered that Magan is the Sumerian name for Egypt. Hence the boat is connected with Egypt.

All the Greek Argonauts were related to one another and more or less anonymous as individuals - reminiscent of the earlier Sumerian 'fifty heroes' accompanying Gilgamesh and also the 'fifty great gods' known as Anunnaki.

The Greek ark of Deukalion came to rest after the Flood at Dodona, from where the *Argo* received its guiding timber. The ark and the *Argo* apparently were related in other ways too.

Professor Cyrus Gordon has written an important book on common origins of Greek and Hebrew cultures from the Egyptian-Sumerian milieu of the cosmopolitan world of the ancient Mediterranean (see Bibliography).

The 'fifty great gods' of Sumer, the Anunnaki, are invariably seated. Sacred oarsmen or Argonauts are all, of course, invariably seated while they are rowing. 'The fifty who sit' and 'the fifty who sit and row' seem to be a motif.

The other element besides the eye in the Osiris-name



hieroglyph is the throne, which is the hieroglyph for Isis as well. The throne is a divine seat. The Sumerians frequently intoned of the Anunnaki that they were 'they who are seated on their thrones'; or sometimes for a bit more drama, the fifty great gods took their seats' (Of course they did nothing even then.)

The Egyptian Anubis (Anpu) was a god 'of the hill'. The Sumerian god Anu's wife was a goddess 'of the hill'.

The older form of the Sumerian word for hill, *hursagga*, may be derived from the Egyptian Heru-sa-agga, where 'agga' refers to Anubis (who was 'of the hill'). There are many other word and name similarities between Egypt and Sumer.

In the *Epic of Gilgamesh* a dream of Gilgamesh is described where he encounters a heavy star that cannot be lifted despite immense effort. This star descends from heaven to him and is described as connected with Anu (who is the god of heaven). Thus we find 'the heavy star' concept in Babylonia long before the Arabs even existed and were to have their star in the Great Dog (and the other in Argo) called 'Weight' and described as 'the heavy star'.

Gilgamesh is drawn to this heavy star irresistibly, in a manner described in a way that seems to hint at a kind of gravitational attraction (to those, that is, who are conscious of a 'heavy star' like Sirius B being gravitationally powerful as well as 'heavy').

The *Epic of Gilgamesh* refers to 'the essence of Anu' possessed by the star. The word rendered as 'essence' is used elsewhere in medical contexts referring to 'concentration, essence' - an intimation of super-dense matter? This 'concentrated star essence of Anu' was too heavy for Gilgamesh to lift in his dream.

It must be recalled that Gilgamesh had his fifty companions in the early versions of the *Epic* (they were discarded later, by Babylonian times). Hence connected with Gilgamesh we find

## THE SIRIUS MYSTERY

- (a) Fifty anonymous companions seemingly important only as a numerological element in the story and in later times discarded as useless.
- (b) A super-heavy star connected with An (also an Egyptian name of Osiris, husband of Isis who was identified with Sirius)
- (c) A description of the star as being composed of a 'concentrated essence' and of having extreme powers of attraction described in a manner reminiscent of gravitational attraction

These elements comprise almost a complete description of Sirius B, a super-heavy gravitationally powerful star made of concentrated super-dense matter ('essence') with the number fifty associated with it (describing its period?) and connected with An (Anu), which we know to be linked in Egypt (and Gilgamesh's 'Magan-boat' seems Egyptian) with Sirius.

## CHAPTER FIVE

# The Hounds of Hell

Since Sirius is the Dog Star, let us turn to the dog-headed Sumerian goddess Bau. According to a leading Assyriologist, Thorkild Jacobsen,<sup>1</sup> 'Bau seems originally to have been goddess of the dog and her name, Bau, to have constituted an imitation of the dog's bark as English "bow wow"'. \* Bau was also the daughter of An. So here the dog-goddess is the daughter of An, whereas in Egypt the dog-god was himself An-pu (Anubis). Since An is connected with Sirius, we should thus not be surprised that he has a dog-goddess for a daughter in Sumer. Sirius as the Dog Star was a tradition which was not thought to have existed in Sumer, however, before now.

Since the fifty Anunnaki were children of An, and Bau is a daughter of An, it is not far-fetched to see in Bau a survival (for she is an old goddess who faded into obscurity in later times) of the concept of a dog-star goddess equivalent to Isis as Sothis. And it is interesting that she was *dog-headed*. For Anubis was not entirely a jackal or dog, he was merely jackal- or dog-headed.

Bau's husband Ninturta was the son of Enlil. Just as

<sup>1</sup> In Egyptian a word for 'dog, jackal' is *Anuau*, which probably has the same 'dog's bark' derivation as the Sumerian Bau.

Marduk usurped the position of chief god, at a somewhat earlier time Enlil had usurped this position from An (The situation is analogous to Greek mythology where Cronos usurped the position of Uranus and was in turn overthrown by Zeus) There is an interesting 170-line hymn to Enlil<sup>12</sup> which seems to describe a stellar abode for the god. The 'lifted eye' or 'lifted light' scanning and searching the lands sounds reminiscent of the Dogon concept of the ray of Digitaria which once a year sweeps the Earth. In any case, a 'lifted light' which searches and scans is definitely a beam or ray, and is in its own right an interesting concept for the Sumerians to have had as situated in the celestial abode. I must emphasize in advance for the reader that lapis lazuli was considered by the Sumerians to represent the night sky. Here then are significant excerpts from the hymn:

Enlil, whose command is far-reaching, whose word is  
ho,y,  
The lord whose pronouncement is unchangeable, who  
forever decrees destinies,  
Whose lifted eye scans the lands,  
Whose lifted light searches the heart of all the lands,  
Enlil who sits broadly on the white dais, on the lofty  
dais

The lofty white dais of Sothis-Sirius is an Egyptian concept. It is Asit (Isis). It is also Asar (Osiris), with the addition of a hieroglyphic eye. Later we find in this hymn from Sumer, the city of Nippur's\* temple in comparison.

Nippur the shrine, where dwells the father the 'great  
mountain',  
The dais of plenty, the Ekur which rises ,

\* Nippur was in the centre of Sumer beside the River Euphrates.

## THE HOUNDS OF HELL

The high mountain, the pure place ,  
Its prince, the 'great mountain', Father Enlil  
Has established his seat on the dais of the Ekur, lofty  
shrines,  
The temple – its divine laws like heaven cannot be  
overturned,  
Its pure rites, like the earth cannot be shattered,  
Its divine laws are like the divine laws of the abyss, none  
can look upon them,  
Its 'heart' like a distant shrine, unknown like heaven's  
zenith. .

And

The Ekur, the lapis-lazuli house, the lofty dwelling  
place, awe-inspiring,  
Its awe and dread are next to heaven,  
Its shadow is spread over all the lands  
Its loftiness reaches heaven's heart.\*

These mentions of the lapis lazuli aspect of Enlil's abode and also that it reaches heaven's heart make quite clear that we are not merely dealing with a solar description. It is not the sun but a stellar abode that is being distinctly described. Hence the references to the ray or beam are all the more curious as they do not refer to the sun's light, as might have been thought from a superficial reading. We continue:

Heaven – he is its princely one; earth – he is its great one,  
The Anunnaki – he is their exalted god.  
When in his awesomeness, he decrees the fates,  
No god dare look on him

\* The most important temple in Sumer was the Ekur at Nippur, the temple of Enlil – chief god of the Sumerian pantheon.

Here we see Enki has been called the exalted god over the Anunnaki (in other texts his son Enki, or Ea, boasts that *he* is their 'big brother' and leader) Here Enki has also himself been given the power of decreeing the fates, which the Anunnaki traditionally do themselves. In the fourth line from the end above, 'heaven' is An and 'earth' is Ki, An and Ki were married. The compound *an-ki* is Sumerian for 'heaven-earth' and is the word meaning 'universe'. Note the similarity between *an-ki* and the name of the Egyptian goddess Anukis who is identified with Sothis-Sirius. Also, of course, the similarity to the name Anunnaki.

So above we find stellar descriptions of Enki, the father-in-law of the dog-headed goddess we tentatively identify with Sirius. And we find those fifty irrepressible Anunnaki creeping in again. They manage to turn up everywhere, given half a chance, when the subject of Sirius comes up.

Now the many similarities between Sumer and Egypt which we have so far noted (with more to come), which have led us to consider the possibility of the two nations having been in some way linked, may be referred to in a most interesting passage from the Jewish historian of the first century AD Josephus, in which 'the children of Seth' are mentioned. Many ancient writers supposed Seth to have been Hermes Trismegistus.

This fact may suddenly be more important in the light of what we have begun to suspect about a scantily surviving authentic Hermetic tradition (maligned and obscured by a welter of useless, trivial co-survivals from later times). Here is the passage:

'The children of Seth' were the inventors of that peculiar sort of wisdom which is concerned with the heavenly bodies, and their order; and that their inventions might not be lost before they were sufficiently known, upon Adam's prediction, that the world was at one time to be destroyed

by the force of fire, and at another time by the violence and quantity of water, they made two pillars, the one of brick, the other of stone. They described their discoveries on them both, that in case the pillar of brick should be destroyed by the flood, the pillar of stone might remain, and exhibit those discoveries to mankind, and also inform them that there was another pillar of brick erected by them. Now this remains in the land of Syria or Seirad to this day.

This passage calls forth many comments. The point which immediately springs to one's notice is that there is a 'pillar of brick' in the land of Syria, or in the land of Sumer-Akkad-Babylonia. Well, this is the very land of brick! It is the land of the brick ziggurat or 'great mountain' — a giant pillar if you like. But where is the land of stone? Why, it is obviously Egypt, the land of the great stone pyramids. Here, then, is a description of two linked cultures, one building brick edifices and the other building stone edifices. In Egypt we have the Great Pyramid, which so many people have believed to contain in its basic construction the proportions and measurements to demonstrate that it was constructed by highly advanced and civilized men. The great ziggurats of Babylon and other cities, too, though in a more ruinous state, seem to embody in their construction much that is profound. Can it be that Josephus has preserved a tradition of the link between Egypt and Sumer and their respective types of building? He says the link was an astronomically defined one. 'The children of Seth' first possessed 'that peculiar sort of wisdom which is concerned with the heavenly bodies'. Well, we have already discovered for ourselves that the fundamental astronomical and astronomical-religious concepts were common to earliest Egypt and Sumer. And here is Josephus telling us the same thing, and what is more, telling us what the treatise 'The Virgin of the World' would have us know — that it all began with Hermes Trismegistus — in the

way we have already discovered in the previous two chapters.

But now let us pursue other relevant ramifications of Egypt found elsewhere. And let us do so by returning to the subject of the *Argo* and the fifty Argonauts, who were all Minyae (descendants of Minyas), who were led by Jason (also a descendant of Minyas) in the quest for the golden fleece at the mysterious land of Colchis, which actually existed and was just about as strange a locale as one could wish. For if you sail through the Hellespont (named after Helle, who fell from the golden ram) into the Black Sea (called the Euxine Sea by the Greeks), and follow the coast of present-day Turkey until you come to the region of the border with Georgia of today, you will have come to Colchis. It is a pretty strange place for the Greeks to attach so much importance to. It sits at the foot of the formidable Caucasus Mountains and not far away are the Georgian people who live in their mountains to such amazing ages as a hundred and ten, with a culture peculiarly their own. Not far to the south is that strange place, Mount Ararat, where the ark of Noah landed after the Flood. Surely this is a most unusual land, and far removed from the Greek world. Or is it?

Minyas had a great grandson called Phrixus. Phrixus had four sons who lived in Colchis, to which he had fled on the back of the golden ram and where he gave the golden fleece to the local king of Colchis, and in return was made welcome and married the king's daughter. It is obvious that these four sons were only half Colchian and would feel some loyalty towards their father's homeland which was in mainland Greece. Sure enough, on his deathbed Phrixus asked his sons to return to Orchomenos, his home in Greece, to reclaim their birthright there. This they agreed to do. For Phrixus's father had been the King of Orchomenos (as had Minyas) and these sons should be able to claim what honour and position (not to mention more material matters) was rightly theirs. However, they knew that setting things straight might be a bit difficult, as their father and his sister Helle (who fell into



the Hellespont) had left in rather a hurry on the golden ram with the blessing of Hermes, but not with too many tears being shed in Orchomenos at the time.

So these four sons set out and were shipwrecked but were fortunately picked up and rescued. Who rescued them? None other than our fifty Argonauts who were just passing. In fact, these Argonaut cousins of theirs were at that moment just happening by on their way to Colchis where their mission was to try to get that fleece back. The four young fellows had no objection to such a plan, especially as they were also descended from Minyas. The Argonauts had been losing some of their men (for instance, Hercules and Hylas had vanished, Hylas was dragged down into a stream by a passionate water nymph and Hercules went berserk and wandered off into Turkey calling his name in vain, later founding cities and doing various Herculean things). So these four fellows from Colchis were just the thing to recharge the ranks.

But what about this place Colchis? Perhaps if we examine it we shall find some Egyptian connections. Anything seems to be possible in a magical land like this.

In fact if we look at the *Histories* of Herodotus<sup>1</sup> we read 'It is undoubtedly a fact that the Colchians are of Egyptian descent. I noticed this myself before I heard anyone else mention it, and when it occurred to me I asked some questions both in Colchis and in Egypt, and found that the Colchians remembered the Egyptians more distinctly than the Egyptians remembered them. The Egyptians did, however, say that they thought the Colchians were men from Sesostris' army.' This Sesostris is identified tentatively by scholars with Ramses II (thirteenth century BC). Herodotus continues

My own idea on the subject was based first on the fact that they have black skins and woolly hair (not that that amounts to much, as other nations have the same), and secondly, and more especially, on the fact that the

Colchians, the Egyptians, and the Ethiopians are the only races which from ancient times have practised circumcision. The Phoenicians and the Syrians of Palestine themselves admit that they adopted the practice from Egypt and the Syrians who lived near the rivers Thermodon and Parthenias, learnt it only a short time ago from the Colchians. No other nations use circumcision, and all these are without doubt following the Egyptian lead. As between the Egyptians and the Ethiopians, I should not like to say which learned from the other, for the custom is evidently a very ancient one, but I have no doubt that the other nations adopted it as a result of their intercourse with Egypt, and in this belief I am strongly supported by the fact that Phoenicians, when they mix in Greek society, drop the Egyptian usage and allow their children to go uncircumcised.

And now I think of it, there is a further point of resemblance between the Colchians and Egyptians: they share a method of weaving linen different from that of any other people, and there is also a similarity between them in language and way of living.\*

So here we see a probable (indeed, almost entirely certain) explanation for the connection of Colchis with the Argonaut story. No wonder the Hermes-given (which is to say, Anubis-given) golden fleece was at Colchis. For Colchis was a thoroughly Egyptian country. But because the heroes of a Greek tale must be Greeks and not Egyptians, the Argonauts are all *Minyae* from Greece. The familiar anonymity of 'the fifty' witnessed by us with the *Anunnaki* of Sumer, prevails here among the Argonauts as well. Different epic poets who treated of the tale chucked in various epic heroes. In the main

\* Circumcision is absolutely fundamental to Dagon culture for religious reasons.

surviving *Argonautica* by Apollonius of Rhodes, Orpheus and Herakles (Hercules) are among the crew, though Hercules is left behind as I have just said. In fact, Hercules was so obviously borrowed for his 'box-office draw' as a 'guest star' in a cameo performance that we can't really take the matter seriously.

On with the story and those Argonauts. I said that Orpheus was included in the cast by that great film producer Apollonius of Rhodes. But another competing film producer, Pherecydes, insisted that Orpheus was not an Argonaut. Diodorus Siculus, a great supporter of women's lib, maintained that Atalanta\* was an Argonautess. Apollonius says pointedly that super-star Theseus was in Hades at the time and otherwise engaged (with another contract), but Statius (who was obviously with the other studio) later made Theseus an Argonaut anyway. H. W. Parke has pointed out that the Apolline seers (who prophesied the future) were apparently injected into the Argonaut story as a propaganda effort by the rising power of the Delphic Oracle which was trying to squeeze out the premier oracle of Dodona and achieve first place for itself in the eyes of the Greek public.

Parke has shown how the really central oracular elements in the Argo story were all related to Dodona, not Delphi. (Dodona is shown on the map, Figure 17, later in this chapter.) Delphi was quite an upstart in the centuries immediately preceding the classical period (which ended with Alexander the Great), and initially was not more important than Dodona, though it was to become so and held precedence by the time of Socrates and the classical Greeks. Parke concludes that all the Delphic and Apolline elements in the Argo story are late accretions from the time after Delphi had usurped the primacy of Dodona. They would not have

\* Atalanta was a mythological figure, a woman who was a great huntress and wrestler, and who announced that she would only marry a man who could beat her in a foot race. Melanion beat her, but by trickery.

been in the *Argo* epic referred to by Homer, who proves the antiquity of the *Argo* saga by his mention in the *Odyssey* (XII. 69-72) of 'the celebrated *Argo*' and of Jason and the Clashing Rocks. Significantly, no other Argonaut is mentioned by name by Homer. It is obvious, in fact from what I said above, that the Argonauts were primarily noted for being fifty in number and related (a comfortable kind of anonymity - cousins!). Outstanding Hellenic heroes were thrown into their ranks by the caprices of successive epic poets to provide recognizable colour. With the exception of Jason there is total disagreement among everyone concerned about just who were the Argonauts. And according to Robert Graves in *The Greek Myths*, Jason was originally Hercules. And Hercules was originally Briareus (a more archaic figure, for an account of him, see pp. 325-9 and 356). Of course, the answer is that they were not individuals and were not meant to be.

They were fifty and they were related and usually seated and they sailed in a magic boat. Just like the Anunnaki, and just like the fifty anonymous companions of Gilgamesh! And in the Gilgamesh fragments from the early Sumerian times, the boat mentioned is a 'Magan-boat', or Egyptian boat. It must be remembered also that Sumer is located between Egypt and Colchis.

We are now beginning to get down to the bare bones of the *Argo* story. I don't believe that the earliest levels of this ancient tale have ever previously been reached.

Not only Herodotus, but Pindar (518-438 BC) as well, describes the Colchians as dark. In his IVth Pythian Ode, which is largely about the Argonauts, Pindar says (212) 'Among the dark-faced Kolchians, in the very presence of Aetes' Pindar therefore confirms Herodotus on this point.

It remains to attempt a dating. If Herodotus is correct and the Colchians were Egyptian soldiers dating from the reign of Sesostriis (Ramesses II), then they would have gone to Colchis at some time during the years 1301-1234 BC, which is

estimated by John A. Wilson<sup>5</sup> as the period of the reign of Ramses II. This dating is only of use as an indicator of the general antiquity of the origins of our material. There does not seem to be any archaeological information of any kind from the undiscovered site of Aea, the capital city of Colchis, which is on the coast of the Black Sea (just by a river known anciently as the Phasis), just across the border of Georgia from Turkey. I would suspect the site of Aea has never even been sought! It would certainly make an interesting site for excavation. It would presumably offer an unusual amount of Egyptian-style material mixed with Armenian-Caucasian styles. It should be extraordinarily interesting from the point of view of ancient art, almost certainly being quite rich in precious metals and beautiful metal-working, particularly gold. We shall see later in this book that it was near a famous ancient metallurgical centre. And, of course, there should be finds which would confirm Herodotus's account.

Here is a description of the site, for those who wish to seek it: 'They reached the broad estuary of the Phasis, where the Black Sea ends — and then rowed straight up into the mighty river, which rolled in foam to either bank as it made way for *Argo's* prow. On their left hand they had the lofty Caucasus and the city of Aea, on their right the plain of Ares and the god's sacred grove, where the snake kept watch and ward over the fleece, spread on the leafy branches of an oak.' (Another hint of Dodona, with the oak and the grove. This similarity will be seen to become extremely relevant later on.)

To return to the question of dates (also bearing in mind Homer's early casual reference to 'the celebrated *Argo*'), we'll recall my mention of dates when I showed the identical nature of the Sumerian and Egyptian astronomical systems in their essential details. I pointed out then that the Babylonian tablets were dated from the second millennium BC, giving us an upper limit on time in the Sumerian region. The Egyptian star clocks to which they bear such total resemblance

calendrically had already altered (such as by the introduction of a fifteen-day week instead of a ten-day one, indicating the advanced degeneration of the traditions) in Egypt in the first millennium BC.

Hence we see that the Egyptian star clocks no longer existed in the necessary form by the first millennium, giving as an upper limit date in Egypt of the end of the second millennium BC. identical with the upper limit we have in Sumer. I am tempted now to steal a phrase of the physicists and remind the reader that these dates are of an order of magnitude comparable with the date of Ramses II's reign adopted tentatively for the settlement at Colchis of Egyptian colonists. Surely these three dates cannot coalesce accidentally round the same material! We have no choice but to adopt the approximate date of 1200 BC as the upper limit for the spread (and subsequent degeneration) of our Sirius-related material throughout the Mediterranean area, from whichever source it originated.

It may perhaps be of some relevance that this coincides roughly with the end of Minoan domination of the Mediterranean. From the point of view at least of the spread of the Sirius material, I would connect it with what seems to me an obvious fact: that when Minoan sea power, based on Crete, collapsed, the Egyptians and inhabitants of the Near East could and did expand their own maritime activities to fill the vacuum left by the disintegration of the Minoan fleets. (An alternative but unlikely suggestion is that fleeing Minoans dispersed their culture with them as they settled in exile in different areas of the Mediterranean following the collapse of their nation, but I do not believe they alone were the source of the Sirius material.)

I am inclined to believe the increasingly strong and accumulating evidence that the Minoan culture was dealt a death blow by eruptions of the volcano Thera. F. Matz, in 'Minoan Civilization: Maturity and Zenith' in the *Cambridge Ancient History*, says 'The peaceful transfer of power in

## THE HOUNDS OF HELL

Crete from the Minoans to the Mycenaeans is difficult to explain. But not, surely, if volcanic eruptions had enfeebled the Minoans. The Minoan cities had no walls. On their island the Minoans relied, it seems, on their unchallenged sea power to keep enemies at bay, just as the Spartans in their unwallied city of Sparta in mainland Greece relied on their unchallenged land power to keep enemies at bay in late classical times. For the Cretan island could not be reached by enemies on foot, and as the Minoans had total naval superiority they could not be threatened at home. The latest conclusions about Thera seem to be that the towns on that small volcanic island near Crete were first evacuated due to earthquakes some years before the final volcanic eruption which destroyed Minoan civilization.

Herodotus in Book I of his *Histories* gives us a good illustration of how hopeless it is for a land power to challenge a sea power on the sea, when he shows the landlubber Lydians abandoning their plans to build ships and extend their conquests to the islands because they are aware they just don't know what they're doing. If the Minoan fleets had been sunk in great tidal waves following volcanic eruptions, the Minoans would have had no choice but to come to an understanding with the Mycenaeans. Any other possibility would have meant suicide. Probably they made a graceful and dignified pact or series of pacts which made the inevitable seem voluntary. And if the Mycenaeans were traditionally a good bit in awe of the more sophisticated Minoans, so much the better for the Minoans who 'condescended' to come to terms like gentlemen.

But the 'spheres of influence' of the sea-going Minoans could not be taken over immediately by the Mycenaeans, who lacked the maritime skill (not to mention ships, to complement on the waves their success in overrunning most of the island of Crete, probably leaving certain areas to the native Minoans according to the pacts I have suggested. It is

not that the Mycenaeans would have lacked the energy or will, but the Minoan fleets would have been destroyed and even the most willing Minoan sailors could not sail non-existent ships for the Mycenaean invaders. Furthermore, the work of consolidating power on the recently taken island would have been a protracted and distracting matter for the Mycenaeans. So, for all these reasons, the new Cretan rulers could not attain to the full stature of their predecessors and be in complete command of the Mediterranean Sea.

The Mycenaeans had been competing with the Minoans (and raiding them, apparently under Theseus) as best they could for some time before the cataclysm. In fact F. H. Stubbings<sup>b</sup> informs us that the Minoans made a 'disastrous Sicilian expedition' against the Mycenaean trading interests in the central Mediterranean. This is reminiscent, of course, of the famous Athenian expedition to Sicily which was a total disaster and caused Athens to lose the Peloponnesian War. Sicily was thus responsible for two great historical disasters that altered the course of events to an unknown extent elsewhere than in Sicily.

So we see the Minoan power may already have been declining. Stubbings says: 'All that is really certain, however, is that the fall of Crete laid the way clear for a vastly increased Mycenaean activity.' And, we may be sure, for a vastly increased Egyptian maritime activity as well. Egypt, which is known to have traded heavily with Crete under the Minoans, must have found itself without choice: expanded maritime activity on her own account or a severe starvation of imported goods. There may even be a possibility that the name Minyas (and, hence, Minyae for the Argonauts) may have some connection with Minos (which gave us the word Minoan). After all, the Minoans were in considerable contact with the Egyptians and were the best sailors of their day.

It has been worth while to go into all this about the Minoan collapse at about the time of the upper limit dates



(c.200 BC—see p. 214) which we have arrived at in other ways. For with the disappearance of Minoan supremacy at sea, vast numbers of other people were free to ply the sea lanes and no doubt did so, bringing a proliferation of variegated contacts between cultures which the uniform Minoan sea traffic had ironed flat and featureless. Enterprising folk from almost anywhere—ethnics from mainland Greece, sophisticates from riverine Egypt, and clever Semites from Lebanon, Canaan, Palestine, all with their eyes on the main chance, could find something that would float and have a go.

All these folk suddenly let loose on the high seas brought an inevitable cross-fertilization at the cultural level, even if piracy must have increased alarmingly. There must have been an amazing amount of syncretism, during which our Sirius material must have leaked out into wider currency beyond the confines of Egypt and Sumer. Two millennia earlier, or even before that, the Egyptian and Sumerian cultures had shared many secrets; now these secrets were let out of Pandora's box and entered what was to become the Greek culture through synthesis in the white heat of warlike Mycenaean exploits at Troy and elsewhere. The Heroic Age was beginning; *arete* (the classical Greek ideal of excellence in all things) was to be forged by blood and iron in the *Iliad*, with the subsidiary sources of the great *Odyssey* and what remains of the *Argo* tales, as well as many other ancient epics of which only fragments survive. Deeply imbedded like subtle dragon's teeth sunk in tough battle flesh, the bony outline of our Sirius material was to peer through the membrane of Greek epic tradition, to spring forth now in our century as the armed men of controversy. They have re-entered the field, we must face them. Rather than enter into combat, let us question these strangers about their origins. We are faced with the living fossils of a world almost entirely beyond our modern comprehension. These creatures are shaggy with the cobwebs of the centuries that preceded even classical Greece,

and came before even Hesiod and Homer. These ghosts are antique in a sense which we rarely encounter except inside the tombs of Egypt or the burials at Ur

To continue with elucidations of the Argonaut complex, we turn now to that invaluable compendium of all that is strange and wonderful about the world of the Greeks, Robert Graves's superb work *The Greek Myths*. There we find<sup>7</sup> 'Aeaea ("wailing") is a typical death island where the familiar Death-goddess sings as she spins. The Argonautic legend places it at the head of the Adriatic Gulf, it may well be Lussin near Pola. Carce means "falcon", and she had a cemetery in Colchis, planted with willows, sacred to Hecate.' In the *Argonautica*, we recall, Jason offers a sacrifice to the goddess Hecate at Colchis at the suggestion of Medea. We shall see later that Hecate is a degenerate form of Sothis, or Sirius. But let us examine the above information from Graves. First we note that Carce, who figures so prominently in the *Argonautica*, has the meaning of 'falcon'. This brings to mind the prominent Egyptian symbolic 'falcon of Horus', which was the symbol of rising from the dead, or resurrection. The hawk or falcon of Horus presided over the Egyptian necropolis at Memphis, so it is quite obvious that it could have presided over the Egyptian necropolis at Colchis.

Naturally, the Greeks would have thought of the falcon in terms of their death-goddess Hecate.\* There was no reason

\* Hesiod's account of Hecate shows her to have been the original Triptolegoddess, supreme in Heaven, on earth, and in Tartarus, but the Hellenes emphasized her destructive powers at the expense of her creative ones. Lion, dog, and horse were her heads—the dog being the Dog-star Sirius' Robert Graves, *The Greek Myths* 317. Hesiod, who lived circa 700 BC, wrote *The Theogony*, a long poem dealing with the origins and genealogies of the gods. In it he says (*Theogony* 4.6) 'In starry heaven she has her place, and the immortal gods greatly respect her'.

for them to preserve the masculine gender of a Horus of whom they knew nothing. But the falcon of Horus could have had a powerful effect on them as a symbol and have been transferred to a feminine figure of Greek myth. In fact, this cemetery of Circe in Colchis is almost undoubtedly an Egyptian cemetery surviving from Herodotus's Egyptian Colchians, and presided over by the falcon of Horus which in Greek was called Circe, and eventually became a female figure. The springing up from the earth of the magically sown soldiers in the *Argonautica* must partially refer to the Egyptian soldiers buried in 'the cemetery of Circe' who were meant to rise from the dead under the auspices of the Egyptian god of resurrection, Horus, whose symbol was the falcon, or 'circe' (Excavations could unearth the Colchian necropolis some day.)

Circe lived on the island of Aea, which has the same name as the city which Jason visited in Colchis and from where Medea came. In Greek mythology, Circe is the daughter of Helios and Perse and the sister of King Aeetes, the king of Colchis. She is therefore Medea's aunt (Medea eloped with Jason). As for the 'island' of Aea, I believe it was a holm, or river-island, in the Phasis River near the city Aea. The Circe episode in the *Odyssey* is so obviously an interpolation into the original and central epic *The Homecoming of Odysseus* — an insertion of some archaic material in a fairly undigested fashion — that any geographical conclusions are unwarranted. If anything, the island of Aea portrayed there seems to be the North Atlantic North Sea, or Baltic Sea!

Circe's father Helios is the sun, who rose every morning from his magnificent palace near Colchis where he slept and stabled his horses overnight. And likewise the father of the Egyptian Horus was the sun, and Horus himself represents the rising sun. The Greek word κίρκη (*kirke* latinized as *circe*) revealingly means 'an unknown bird', if we consult (as

we shall do from now on) Liddell and Scott's definitive Greek lexicon. In the form *κῑρκος* (*kirkos*) the meaning is 'a kind of hawk or falcon', 'a kind of wolf', 'a circle (which in Latin became *circus*) or 'ring', and 'an unknown stone'. *Κῑρκαια* (*kirkaiā*) means 'an uncertain plant'. Of these only the proper noun *Κῑρκη* (*Kirke*) has the specific meaning of Circe the Enchantress, although the same word in general is 'an unknown bird'. How appropriate a reaction for the Greeks to the falcon of Horus – a bird symbol unknown to them. But in trying to be more precise they make *κῑρκος* (*kirkos*) 'a kind of hawk or falcon', as that is obviously what it is from its appearance, though its especial symbolic value makes the Greeks doubt precisely what the Egyptians intended. It looked like a kind of hawk or falcon but the Greeks weren't prepared to insist on exactly what species – because it was an Egyptian, not a Greek, idea.

On a point such as this we must 'take advice' as from a lawyer. It is not sufficient merely to cite Liddell and Scott's lexicon. For this subject we turn to D'Arcy Thompson's definitive source-book *A Glossary of Greek Birds*.<sup>8</sup> Under the entry there for *kirkos* we read: 'A poetic and mystical name for a Hawk, the sacred Hawk of Apollo, in the main an astronomical, perhaps solar, emblem. In Homer the bird of Apollo. *Od.* xv. 525. The bird is not identifiable as a separate species, and is so recognized by Scaliger and others. Neither the brief note as to its size in a corrupt passage of the ninth book of the History of Animals, nor the mystical references to its alleged hostilities and attributes in Aristotle, Aelian, and Philo, are sufficient to prove that the name indicated at any time a certain particular species. The word is poetical. The chief allusions to *κῑρκος* are obviously mystical, though the underlying symbolism is not decipherable.'

Under another entry, for *Hierax*, Thompson gives some

further interesting information. The word *hierax* is a generic term for all hawks. It too seems to partake of overtones of Horus, as Thompson specifically notes when he refers to the 'Worship of Hawks in Egypt', citing Herodotus and Aelian, and says 'In the Rig Veda\* the sun is frequently compared to a hawk, hovering in the air. Their heart is eaten, to obtain prophetic powers, Porph. *De Abst.* 1. 48<sup>9</sup>. The Hawk entered in Egypt into innumerable hieroglyphics (as) Horus and Hat-Hor, the latter being the  $\delta\iota\kappa\omicron\varsigma\Omega\rho\omicron\nu$  of Plutarch. According to Chaeremon, fr. 8  $\psi\lambda\chi\eta$  'ἡλίου θεός =  $\epsilon\pi\alpha\chi\acute{\epsilon}$ . On the sanctity of hawks in Egypt, and the solar symbolism associated with them there, see also . . . etc., referring to Porphyry, Plutarch, Eusebius and Clement of Alexandria. The scholarly reader who wishes to pursue all this must go to Thompson directly.

*Kirkos* also means 'an unknown stone'. Here again we come upon the stone motif which we encounter with Deukalion (the Greek Noah) and elsewhere. The stones of Deukalion spring up as men—men born from the earth just as the dead of the Colchian cemetery are meant to be born again from the earth.

A further connection of Circe with the Sirius complex lies in the fact<sup>10</sup> that the island of Circe was the place where Orion met his death. Orion as a constellation was identified (as Sah, its Egyptian name) with Osiris, the husband of Isis, who was identified, of course, with Sirius.

The stone motif in its recurring forms seems to have had a particular connection with the Minyae, as I discovered from that invaluable duffle-bag of information, the ancient Greek author Pausanias (flourished c. 50 AD), whose *Guide to Greece* is a real 'experience'. The Minyan city was traditionally that of Orchomenos in Boeotia, and it will be recalled that all the

\* The oldest Sanskrit text, dating to c. 300-1200 BC.

Argonauts were Minyae and descended from Minyas, King of Orchomenos.

All my references to Pausanias will be to Peter Lev's excellent translation published in two volumes by Penguin in 1971 with extensive notes and comments by that learned Jesuit translator, who has travelled over most of the terrain described by Pausanias and attempts a running commentary on the present state of the ruins and sights (and sites).

In Book IX, 34, 5, we read 'Over from Mount Laphystion is Orchomenos, as famous and glorious as any city in Greece' Levi's footnotes tell us. 'No one knows which mountain this was: probably the one above Hagios Georgios and the modern Laphystion' and '(Orchomenos is) at the north-west corner of the old Kopais Lake.'

At Orchomenos 'there are graves of Minyas and of Hesiod' (38, 3). At Mount Laphystion nearby was (34, 4) 'the sacred enclosure of Laphystian Zeus. The statue is stone. They say Athamas was about to slaughter Phrixos and Helle here when Zeus sent the children a ram with a golden fleece and they ran away on the ram.'

Now note what Pausanias says (38, 1) about the Minyae of Orchomenos: 'Orchomenos has a sanctuary of Dionysos, but the most ancient one is consecrated to the Graces. They pay particular worship to rocks, saying they fell out of heaven for Eteokles: finely made statues were dedicated in my time but even these were in stone.' Levi adds, 'The ruins of these sanctuaries are on the site of the old monastery (now itself in ruins).' Now, I believe this singular observation on the Minyae's preoccupation with stones ties in with all the recurring stone motifs in our material. And now we shall see a further recurrence which ties back in another way (38, 4) 'The Orchomenians had a legend about Aktaion. *An apparition with rocks in its hand* was devastating the countryside: when Delphi was consulted the god ordered them to find anything that was left of Aktaion and cover it with earth, and

then make a bronze image of the ghost and rivet it with iron to a rock. I have seen this riveted statue, once a year they burn offerings to Aktaion as a divine hero' [the italics are mine].

Aktaion happened to see the goddess Artemis (known to the Romans by her Latin name of Diana) of the silver bow bathing naked. Artemis then hunted him down, with fifty hounds, transformed him into a stag, and killed him with her bow (not only are hounds connected with the Dog Star but the bow is a familiar symbol connected also with Sirius, which was so often known in ancient times also as the Bow Star). This scene is portrayed in Figure 18, from an ancient Greek vase painting from approximately 470 BC.

Not only were the hounds of Hades who chased Aktaion fifty in number, but Robert Graves tells us 'Actaeon was, it seems, a sacred king of the pre-Hellenic stag cult, torn to pieces at the end of his reign of fifty months, namely half a Great Year'.<sup>1</sup> Note the application of the number 'fifty' here to a period of time. The orbit of Sirius B around Sirius A is fifty years, the reign of a sacred stag king was fifty months. We know how often in ancient traditions the numerical quantity of time periods remains stable while their quality (as individual durations) varies. The classic examples are in the Bible, where the seven days of creation refer to seven aeons, and the 'years' of life of the Hebrew patriarchs such as Methusaleh are not correctly interpreted as solar years but as lunar months or 'lunar years' a month long (since by late times the area of the New East which had by then produced the people known as Hebrews had succumbed to a lunar calendrical craze. Literally 'moonstruck' and everything was a lunar rather than a solar period of time to those people in that area).

Note further the reference to a 'Great Year' of twice fifty months, consisting of two reigns. This would be one hundred months. And it should not surprise us to learn now that the

## THE SIRIUS MYSTERY

name of the Greek goddess Hecate literally means in Greek 'one hundred' \*

Perhaps something of the true meaning of the myths is now becoming evident. The ancient peoples were not concealing information from us out of spite. Their purpose in disguising their secrets was to see that those secrets could survive. In fact, so successful were the ancient Egyptians in accomplishing their purpose, that the Greeks often preserve earlier Egyptian secrets in total ignorance of their true meaning, retaining only through an innate conservatism certain peculiar archaic details which we now find to be so important. Not only are the stories mythical and symbolical in that they are not meant to be taken at face value, but they even involve 'characters' and 'events' which have a strictly numerical significance. But this should have been quite obvious to the reader since we began to study the Anunnaki. It is, admittedly, difficult for those of us who have been brought up in our strictly literal civilization, where there is no such thing as a hidden meaning and everything is on the surface, to think in such a way as to understand the ancient myths. It was, after all, only a century ago that supposedly intelligent people were maintaining that the Earth was created in 4004 B.C., on the basis of what the Bible was reputed to have said! And it was only in the 1930s that the courts of Tennessee, in the famous Scopes trial, decided that the theory of evolution was not only unholy but illegal and could

\* The Dogon tribe often describe the fifty-year orbital period of Sirius B by saying 'The period of the orbit counted double, that is, one hundred years, because (of) the principle of twinning' (see Appendix I). Here we have the same custom in operation among the Greeks, of 'twinning' their sacred durations for  $50 \times 2 = 100$ . Hecate ('one hundred') unites them. As both Sirius B and Sirius C have 50-year orbits around Sirius A (C of course having its own orbit around B in addition), the 'twinning' could refer to the fact that these are two stars which simultaneously share the 50-year orbital period. This would explain the  $50 \times 2 = 100$  tradition.





The Dogon village of Songho in Mali. © A Costa

A general view of the Dogon village of Koriakan in Mali. © A Costa





A Dogon priest's house near Songho in Mali. A libation has been offered to Anima, the one god of the Dogon, and has dripped down the front of the house  
© A Costa

*Below:* Ancient pictograms painted as frescoes on the walls of a sacred cave at Songho in Mali. This cave with its sacred art has been used by the Dogon for religious observances for many centuries  
© A Costa





The dancers in the Sigi Festival, which is associated with the Sirius star system, last held by the Dogon in 1963. Komakan in Mali. © *A Costa*

The Dogon dancers dressing up before dancing at the village of Komakan as part of the Sigi ceremony. © *A Costa*





Dogon dancers make their way to the village square of Komakan to celebrate the Sigui Festival. © *A Costa*

A group of three small pottery figures of amphibians or priests dressed as amphibians (each 2.6cm high) which formed a cache believed to have been excavated beneath the foundations of a temple at the Babylonian city of Nineveh in the mid-nineteenth century and presently in the Department of Western Asiatic Antiquities of the British Museum (objects 01.B.35-7). These figures represent three of the 'Seven Sages', or *apkallu*, otherwise known as Oannes or Dagon – the amphibian culture heroes who founded Sumerian and Babylonian civilisation. It was very common to bury small figurines of the Oannes or *apkallu* group as sacred dedications beneath the foundations of buildings of religious importance. © *British Museum*



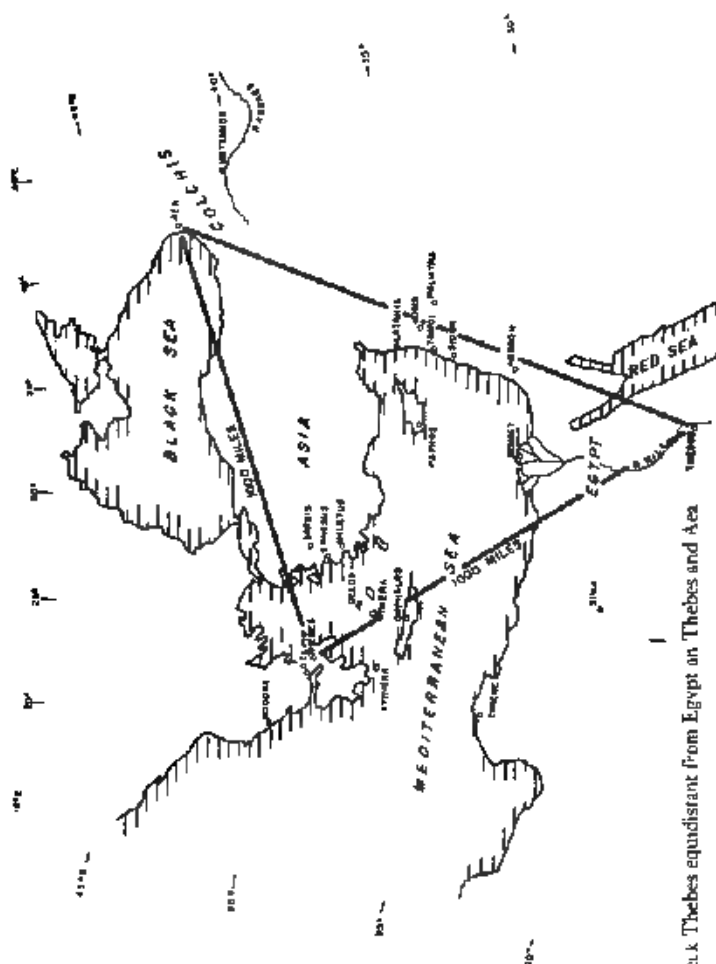


Figure 17 Circle Thebes equidistant from Egypt on Thebes and Aea

## THE SIRIUS MYSTERY

not be taught in the schools. During the 1970s, 1980s and 1990s the fantastically stupid 'Creationist Movement' has grown in America - ignorance carried to supreme height. We mistakenly assume that because we have superlative technology and science we must also be extremely civilized and come from a subtle background of sophisticated thinkers. But this is all a base illusion.



*Figure 1b* The goddess Artemis sets the hounds of hell upon Aktaion and slays him. She holds the bow of Sirius the Bow Star. The hounds are the hounds of Sirius the Dog Star. She is herself, in this guise, a Greek version of Sirius the goddess. But the tradition has become confused and fragmented by the Greeks, broken down into elements which are used to construct other myths. Artemis is not generally a representation of Sirius, but of the moon. The bow and the dogs are here merely left-over trappings from an earlier forgotten symbolic system. (From a red-figured vase in the Berlin Museum c. 470 BC.)

In fact, we are on a low rung of the ladder of evolutionary intelligence, and in many ways (such as ethics and aspirations to excellence) we have gone backward since those early mutants in our paltry intellectual history on this planet, Confucius, Socrates, the Buddha, and the others of whom every reader may substitute his own favourites.

But this book is not meant to be a sermon on the evils of a vacuous civilization. We are meant to be examining the names of some of the principal characters of the *Argonautica*, and it is best that we pretend to ourselves that we are rational creatures and supremely moral, and turn back to the subject again.

The name Jason means 'appeaser' in Greek, which is in accordance with his vacillating character (see Rieu's introduction to his Penguin translation of the *Argonautica* for some caustic comments on Jason)<sup>12</sup> 'Medea' means 'cunning' 'Aeetes' means 'mighty' or 'eagle', and he was Medea's father, the King of Colchis from whom Jason stole the fleece.

Now we have seen that Aktaion was associated with Minyan Orchomenos, with a rock-throwing ghost (echoes of Deukalion), with fifty hounds of Hades, and with a reign of fifty months. The connections go even further. From Pausanias (34, 4) we learn that on Mount Laphystion is the place described thus. 'Higher up (from the spot where the ram with the golden fleece leapt into the air and took off) is Fire-eyed Hercules where the Boeotians say Hercules came up with the dog of Hades.' Now, this 'dog of Hades' is Cerberus, who originally had fifty heads! (Later the simplification of three heads, as for Hecate who was also of Hades, was adopted for Cerberus, when fifty must have seemed to make no sense and was probably too difficult to paint on vases. But of course three is significant too. The Egyptians portrayed three goddesses in the Sothis-boat Sothis, Anukis, and Satis.)

Graves informs us<sup>3</sup> that, 'Cerberus was, at first, fifty headed, like the spectral pack that destroyed Actaeon (see 22 1); but afterwards three-headed like his mistress Hecate (see 134 1).' (The three-headed Hecate is the three Sothis-goddesses blended in one and is an underworld counterpart, just as with the Sumerian Anunnaki of the underworld.)

What of the fleece itself? There are obvious connections of the golden fleece and Colchis with the common golden yellow dye which comes from saffron (*crocus sativus*). The crocus with its saffron is even today confused with 'meadow saffron' (*colchicum*) which takes its name, obviously, from Colchis, which was its chief area of production. The *colchicum* plant which somewhat resembles the crocus in its flowering stage was terribly important to the ancient world. It was the only known medicine against the disease of gout (and indeed still is). It is known to have been used to treat gout in ancient Egypt and all over the ancient Mediterranean. As Colchis was the place to find *colchicum* that may explain why the Egyptians first settled there! (I have seen immense plains and hills covered in *colchicum* near the Atlantic coast of Morocco, but these would only have been accessible in ancient times to the Egyptians by sailing out into the Atlantic and following the coast southwards, taking rivers inland of the proper point, and then returning safely. This was evidently an almost impossible task in ships with square sails, lacking both proper rudders and fore-and-aft rigging.)

It is probable that the crocus and ordinary saffron was present in Colchis in abundance, along with the false or meadow saffron, *colchicum*, and that the two became as confused with each other in ancient times as they are today. Indeed, it is only modern botany which proclaims a difference between the two to the extent that we no longer confuse them officially. As real saffron produced a much valued dye, it is not surprising that a golden fleece dyed golden yellow by saffron dye would be said to exist in Colchis!



And indeed, Medea's famous herbal knowledge was well suited to Colchis, which produced the only cure for one of antiquity's most dreaded diseases, a disease which causes terrific pain and discomfort and could only be relieved by the magic herb from the mysterious distant land of Colchis. I Burkill <sup>4</sup> gives interesting information on the early history of saffron. He says that sun worshippers speaking an Aryan language spread to India from Turkey and made the saffron crocus an object of veneration and found ways of using its colour. <sup>5</sup> This information, given by Täckholm and Drar, <sup>16</sup> offers a great deal of support to my contention.

Richard Allen <sup>17</sup> discusses Aries (the ram) and says that the Egyptian stellar ram's stars were called the Fleece. He adds that the god Zeus-Amen (Ammon-Jupiter, 'assumed the Ram's form when all the inhabitants of Olympus fled into Egypt from the giants led by Typhon'. And in this discussion of Aries, Allen mentions 'some of its titles at a different date being applied to Capella of [the constellation of] Auriga'. This is the sort of process we shall encounter again and again - titles and descriptions of stars being applied to neighbouring or similar stars as the original traditions become confused. It is particularly evident in the application of the description of 'heavy' or 'weight' to different stars associated somehow with Sirius, as the original object to which this description was meant to apply, Sirius B, was not visible and so tradition, being conservative, kept the description and applied it to other stars related to Sirius which could actually be seen. As with numerical traditions like that of 'fifty', when the true significance was forgotten, the symbol or concept was merely given a new, impromptu explanation.

Aries was definitely identified with the golden fleece. Allen gives much information regarding this.

It always was Aries with the Romans, but Ovid called it

*phrixæ ovis*, and *Columella pecus athamantidos helles*, *phrixus*, and *portitor phrxi*, others *phrixæum pecus* and *phrxi vector*, Phrixus being the hero-son of Athamas, who fled on the back of this Ram with his sister Helle to Colchis. On reaching his journey's end, Phrixus sacrificed the creature and hung its fleece in the Grove of Ares, where it was turned to gold and became the object of the Argonauts' quest. From this came others of Aries' titles, *ovis aurea* and *auratus*, *chrysomallus*, and the Low Latin *Chrysovellus*.

As the fleece was a solar symbol, it is just as well that we look at the concept of Horus once again. Horus in Egyptian is Heru. And from Wallis Budge we learn that Heru is 'the ancient name of the Sun-god'.<sup>18</sup> The word *heru* also has the meaning of 'face'.<sup>9</sup> But let us consider the following: Heru (Horus) and his hawk/falcon presided over the Colchian cemetery and gave the name to Carce (which means 'hawk/falcon') who was Medea's aunt. The Greek sun-god Helios was said to stable his horses at Colchis and have a magnificent palace there, from which he arose every morning. Also Colchis was the place of residence of the solar golden fleece.

Now, we recall that in Egyptian the letter 'h' and the letter 't' are entirely interchangeable and have the same hieroglyph. Consequently, Heru could just as readily be Heu. If one takes Helu and puts a Greek ending on it one gets Helios! And the same word means the sun-god in both the Egyptian religion (early) and the Greek religion (early). In both lands the name was eventually superseded, in Greece by Apollo, for instance. So here we have a further connection between the Greek tradition as centring round Colchis and the Egyptian tradition as settled there, only this time the evidence is linguistic.

It seems that the curious Greek word *hero* comes also from *heru*, though a word similar to *hero* exists in Sanskrit,

the language of ancient India after 1200 BC. The word in Sanskrit which has the meaning of 'hero' is the related *Vira*. It is used in the precise sense of 'hero (as opposed to a god)' in the early *Rig-veda* and is thus attested at the time of the first migrations of Aryans into India. There is no question that the two words are cognates of each other. However, I propose for them (and we shall see more examples of this later in the book) a common derivation from the Egyptian *heru*.

The word *heru* is given a meaning by Wallis Budge<sup>20</sup> almost identical with that of *hero* and *vira* and is described as follows 'applied to the king as the representative of the sun god on earth'. This is a precise meaning applying to a human being on earth who is neither god nor daemon, but *hero*. Liddell and Scott make clear that the word was not used solely for those warriors who were prominent in battle, but was used to describe the minstrel Demodocus, the herald Mulus, and even (in the *Odyssey*, 7, 44) 'the unwarlike Phaeacian people are so called'. In Homer the heroes were exalted above the race of common men, but particularly in Pindar the poet, we find the word used to describe a race between gods and men, in precisely the sense that we should expect the word *heru* to survive in another language. This Egyptian application of the word to their Pharaohs survived almost without change in Greek and Sanskrit and later in Latin and the later Indo-European languages.

It is interesting to note in the account of the word *Helios* as given by Liddell and Scott, Homer used the term in reference to 'the rising and setting, light and darkness, morning and evening'. In Egypt the precise application of Horus as sun-god was in his activity as rising and setting. He was the child who was born afresh each morning (and to the Greeks *Helios* was born afresh every morning at Colchis). Homer has thus used the *heru*-derived *Helios* in precisely the manner which we might have expected of an Egyptian rather than a Greek poet.

In Liddell and Scott we find the listing immediately after *Heios* of *Helio-Serapis*, which is 'an Egyptian divinity'. I leave the reader to draw his own conclusions regarding this clear use of the word *Heios* to preface a description of *Serapis*. *Serapis* was the Greek form of *Asar Hep*, *Hep* being what is known in Greek as *Apis* the Bull. *Asar* is, of course, *Osiris*. In Egyptian it was quite common for there to be references to 'Horus-Osiris' combining *Hera* and *Asar*. Here in Greek we find this, if we accept my thesis of the derivation of *Helio* from *heli* or *heru*.

The reader is by now presumably immune to shock at the endless 'surprises' which arise in the course of this enquiry. Hence he will no doubt be prepared to learn that if we shorten the 'e' (from eta to epsilon) in Greek, we have the *heru*-derived word (which has dropped the aspirate, probably in connection with the shortening of the vowel) *erion*, which means 'woollen fleece'.

There is a possibility that *Hera* ('the glory of *Hera*'), the original captain of the *Argo* according to Graves, and his protectress the goddess *Hera* (wife to *Zeus* and Queen of the gods) are derived from *heru* and they are known to be related to the word *Seirios* which gave us *Sirius* and the Sanskrit *svar*, *suryas*, etc. In Sanskrit *Sura* means 'hero', indicating that these words may relate also. Liddell and Scott believe this complex of words to be separate from the *Heios*-complex, but their opinion is only an opinion. *Surana* means 'fiery', just as *Seirios* can in the sense of 'scorching' (due to the supposed 'scorching' of the Dog Star, etc.).

Back to our fleece. We find that the Greek word for a woollen fleece is related to the Egyptian word for *Horus*, the Greek word for *sun*, etc., etc. So much for the puzzling nature of that now moot question: Why a fleece? Back to sacred puns again, which besiege us endlessly.

Let us not forget the Sumerians. Let us look again at that

list of the fifty names of Marduk. One of them is the name Nebiru. It is commonly taken to be the name of the planet Jupiter, but there is confusion there, and the word is discussed in *Hamlet's Mill* and many other places as one of the infuriating Sumerian words which we would like to understand. Where did it come from? What does it mean? Why is it one of the fifty names?

Immediately after this forty-ninth name, Marduk is called 'Lord of the Lands' (its Akkadian form, which has no significance for us, is Bēl Mātāti, I do not know the Sumerian form, which might be of interest to us). Then, after this supposed fiftieth name comes another name, namely Ea (Enki). Then Marduk is described as being of fifty names. It seems not to make perfect sense, since he has just been given fifty-one names. One way in which to make it sensible is to treat 'Lord of the Lands' (which is given in English in Speiser and Heidel, unlike all the other names) as a synonym of Nebiru. If we do this, then Ea is the fiftieth name and everything is all right.

Now, let us look at the Egyptian language once again. We find that the word *Neb* is extremely common and is used in many combinations and means 'Lord'. Without further ado, let me make clear that I believe the Sumerian Nebiru to be derived from the Egyptian Neb-Heru. If we treat Heru in its older Egyptian sense as the sun, then the descriptions of Nebiru in the Babylonian *Enuma Elish* could read as a perfect description of Neb-Heru – the Lord the sun: 'Nebiru shall hold the crossings of heaven and earth. He who the midst of the Sea restlessly crosses, / Let "Crossing" be his name, who controls its midst,' etc., though overlaid with this, as with the traditional Horus, is a strictly stellar element which is behind the more obvious solar element. However, I do not wish unduly to confuse the issue by peeling off too many layers at once. Suffice it to recall the previously mentioned associations of Horus with the Sirius system and note that

there is a Heru-ami-Sept-t 'Horus of Sothis' and Heru-Sept 'Horus the Dog Star' and then to note, again in association with Nebiru which is supposed to have been Jupiter, that there is in Egyptian a Heru-sba-res 'Horus, star of the south, i.e. Jupiter', and Heru-up-Shet, 'the planet Jupiter', also in the *Enuma Elish* Nebiru is clearly described as 'a star' Horus also exists as Heru-ami-u which is 'a hawk-headed crocodile with a tail terminating in a dog's head' The dog is related to Sirius. Heru-ur-shefit is a jackal form of Horus, *heru* is also the name of a sceptre and of a jackal-headed standard in the other world. A form of Horus using the common word Neb is Heru-Neb-urr-t, meaning 'Horus as possessor of the supreme crown' Another of several is Heru-Neb-pat, meaning 'Horus, lord of men' Heru-Neb-tau is 'Horus, Lord of the Two Lands'. Recall our synonym for Nebiru - 'Lord of the Lands'!

We are getting deeper and deeper into the legend of the golden fleece, of origins of Greek and Middle Eastern ideas in Egypt, along with key words and names, etc. All these centre round the curious Sirius complex. What more will we uncover? Perhaps we need a break from all these Egyptian words. There are many other aspects of our subject, and it leads us ever closer to the solution of our mystery - which is the origin of the subject.

## Notes

- 1 *Toward the Image of Tammuz and Other Essays*, Harvard University Press, USA, 1970.
- 2 Kramer S N *History Begins at Sumer*, Doubleday Anchor Book, New York, 1959, pp 41-4.
- 3 *Antiquity of the Jews*, Book 1, Chapter 2
- 4 *Herodotus*, trans. A. de Selincourt, Book 2, 103.
- 5 In Pritchard, *Ancient Near Eastern Texts*, p 8
- 6 'The Rise of Mycenaean Civilization', *Cambridge Ancient History*
- 7 Graves, Robert. *The Greek Myths*. 2 vols., Penguin Books, London, 1969, 170.5

## THE HOUNDS OF HELL

8. Thompson, D'Arcy Wentworth, *A Glossary of Greek Birds*, Oxford 1896.
9. Porphyry, *On Abstinence from Animal Food*, for those who are not familiar with the traditional abbreviations Porphyry was an early Neoplatonist, a student of Plotinus, who transcribed the *Enneads*. Thomas Taylor translated much of what survives of Porphyry's own writings, including *On Abstinence*, in *Select Works of Porphyry*. London 1823.
10. Graves, op. cit., 170-6.
11. Ibid., 22-1.
12. Robert Graves takes the view that Jason means 'healer'.
13. Graves, op. cit., 31-3.
14. The reference is to I. Burkill (1935) but I have not been able to trace the publication concerned and have gone to immense pains over it. Burkill was a noted botanist. A botanical publication of his for 1936 is not the correct reference. See Note 15 for source.
15. Täckholm, Yvi, and Drar Mohammed, 'Flora of Egypt' Vol. III, *Bulletin of the Faculty of Science*, No. 30, Cairo University Faculty of Science, Cairo University Press, 1954.
16. See Note 15.
17. *Star Names*, op. cit. See entry under Aries.
18. Wa. is Budge, *Hieroglyphic Vocabulary to the Theban Recension of the Book of the Dead* London, 911. See entry for *Her*, p. 273.
19. Ibid., p. 271.
20. Ibid., p. 273, entry for *Her*.

## SUMMARY

The Sumerian god An had a daughter, Bau (representing the sound of a dog barking, as does the ancient Egyptian word for 'dog', *awau*), who was a dog-headed goddess. The Egyptian god Anubis (Anpu) was a dog-headed god.

The Sumerian Bau, as a daughter of An, is a sister of the fifty great gods (Anunnaki) who are also children of An. Since Bau may be a goddess of the Dog Star Sirius, the fact that she is the sister of 'the fifty' is significant, as Sirius B has an orbital period of fifty years.

The golden fleece was situated at Colchis in the Black

Sea, where Jason and his Argonauts went to see it. Colchis was an ancient Egyptian colony before 1200 BC.

Herodotus emphasizes that the Egyptians originated the practice of circumcision, which survived also among the Colchians whom he visited (the Hebrews acquired circumcision from the Egyptians while in bondage). It is noteworthy that the Dogon ceremony of the Sigui, which is connected with the Dogon Sirius mysteries, centres largely round rites of circumcision.

Prominent in the story of the *Argo* is the female character Circe (whose name means 'falcon' or 'hawk'). Horus, son of Isis and Osiris, was symbolized by a falcon or hawk. Circe presided over the Colchian cemetery (which was originally Egyptian, Colchis having been an Egyptian colony). Horus, who presided over the cemetery of Memphis in Egypt, would have presided also over the one at Colchis while Egyptian influence was still directly exercised. Circe is obviously a Greek derivation of Horus.

The word *kyrke* (Circe) in Greek (which we customarily write 'Circe' due to our habit of changing Greek k's into Latin c's) specifically means 'a kind of hawk or falcon' or 'an unknown bird'—just the sort of confusion we should expect among the Greeks with regard to a concept derived from Egyptian culture and imperfectly understood.

Aktaion, representing a sacred stag-king, was hunted down by fifty hounds (the dog motif joined to fifty) and killed with a silver bow (Sirius has also traditionally been known as 'the Bow Star', and in Egypt the goddess Sirius holds a bow).

The sacred king, such as Aktaion represented, had a 'sacred reign' of fifty months. It is arguable that 'fifty months' is a shorthand version of 'fifty years', but we now see undeniable ancient traditions connecting Sirius with fifty intervals of time (whether months or years) comprising 'a reign'. And of course the orbital period of Sirius B is fifty years comprising 'an orbit', which in mythological parlance



could quite easily be considered 'a reign'

As is explained in Chapter Seven, the fifty month period later became applied to the Olympic Games when they were established. It defined the interval of time separating them approximating four solar years. In fact the Olympic Games were actually separated by alternating intervals of 49 months, then 50 months, then 49 months, etc. This suggests even further an attempt more closely to approximate the  $49\frac{1}{2}$  years of Sirius B's orbit in 'month-code'. For by doubling up in this way, using the nearest two whole numbers in alternation, the exact correspondence was obtained, for 49 plus 50 gives the same as  $49\frac{1}{2}$  plus  $49\frac{1}{2}$ . Robert Graves has offered the only previous theory to explain the 'fifty months' in ancient Greece, but his lunar theory does not explain the alternation between 49 and 50, or other mysterious aspects. It is probable that the true explanation based on the Sirius mystery was later overlaid by a lunar tradition which was offered as an 'explanation' to non-initiates, despite its obvious flaws.

It was customary in ancient times also to group together two sacred reigns of fifty months each to form a 'Great Year' of one hundred months. (In practice, as with the Olympic Games, 99 months were actually used but in theory one used the round figure of 100 months conceived of as 'two reigns'.) The name of the Greek goddess Hekate (Hecate) literally means 'one hundred'. She was involved with the *Argo* tale and specifically identified by Robert Graves with Isis, and in other ways linked to Sirius as an 'underworld version'. Since both Sirius B and Sirius C may share a fifty-year orbit around Sirius A, we can possibly understand the 'twice-fifty years' as an esoteric reference to that.

The fifty hounds of hell who pursued Actaeon have a counterpart in Cerberus, the hound of hell who had fifty heads in the earlier tradition. These fifty heads were later discarded in the tradition, like Gilgamesh's original fifty companions, and Cerberus was said to have three heads. But

originally he had fifty, as Hesiod describes him. This is thus yet another dog-motif connected with fifty (Sirius being the Dog Star), and linked to Sirius in various ways, such as through the goddess Hekate as an underworld version of Sirius. (The fifty Sumerian Anunnaki also had their counterparts in the underworld. Fifty in the underworld as 'death-counterparts' or shadows to fifty in heaven makes one hundred—the very meaning of Hekate.)

The only known cure for gout (a serious ancient Egyptian complaint) is a substance taken from the plant colchicum, named after Colchis where it grew. This may explain a colony at Colchis. Colchicum is also called 'meadow saffron' and resembles true saffron (which also grows along the Black Sea coasts), which gives a golden dye, perhaps explaining the 'golden' fleece. A golden fleece is a solar symbol. Horus was a solar god. The letters 'l' and 'r' are interchangeable phonetic liquids. The Egyptian form of Horus, Heru, can become Heka and give us the Greek solar god's name Helios. Helios was supposed to stable his horses at Colchis. The Greek word for 'woollen fleece' is *erion*, a word similar to Heru with a dropped aspirate ('h').

## CHAPTER SIX

# The Oracle Centres

A consideration of the ancient oracle centres will now be useful in our quest. These centres in the Middle East seem at a casual glance to be dotted around apparently at random. However, there is actually a pattern in their distribution which we will find bears some relation to our subject, and which indicates a highly advanced science of geography and related disciplines in the ancient world. Examination of the oracle centres will be seen to have a connection with the ship *Argo* and will help us to fill in some of the missing background to the entire system of the ancient religious mysteries. The oracle centres were the main places where religion was practised in the ancient world. It makes sense that their occurrence would not be the product of pure chance, and certainly not of convenience. What place could be more out of the way than Dodona in Greece? It was geographically outside the sphere of the civilized world of the Greeks, somewhat more north and more west than any Greek could call comfortable. Why was such an important and senior place of worship in the wilds? Indeed, for that matter, why did Noah's ark land on a mountain nobody ever visits and which is far more remote than even Dodona? The ark and *Argo* and their connections with the Sirius mystery will now be seen to have an intimate connection with the entire

geographical structure of the practice of religion in the ancient Mediterranean world. It is important that we explore these extraordinary ramifications fully.

Now we are about to consider a most difficult and complex web of ancient practice. Let us look at the ship *Argo* as if it were spread over the surface of the globe by projection. This may seem a curious idea, but the reader must bear with me. After all, the boat is celestial, so why not a projection on the earth's surface from above? Most prominent in the constellation is the star Canopus which was called 'the Rudder', *pedalion*, by Aratos, Eudoxus, and Hipparchos (the leading Greek astronomical figures before Ptolemy), as we are informed by Allen.<sup>1</sup> The use of the word 'rudder' is actually incorrect, because there were no real rudders at this time, technically, one should say instead 'steering-oar'.

There was a place named Canopus on the northern coast of Egypt, which was quite a famous city to the Greeks, and Allen describes it thus. 'Ancient Canopus is now in ruins, but its site is occupied by the village of Al Bekūr, or Aboukir, famous from Lord Nelson's Battle of the Nile, 1 August 1798, and from Napoleon's victory over the Turks a year afterwards, and it is interesting to remember that it was here, from the terraced walls of the Serapeum, the temple of Serapis, that Ptolemy made his observations.' In his book *Hellenistic Civilization*, W. W. Tarn comments on Canopus after Alexander the Great had founded Alexandria near it, that from Alexandria 'the gardens of the wealthy extended to Canopus, Alexandria's playground'. To the Greeks, Canopus was the most famous Egyptian city on the northern coast before the foundation of Alexandria. In earlier times the fame of Canopus was held by a city called Behdet, which was a pre-dynastic capital of Egypt before the unification of Egypt and the transferring of the capital to Memphis further south. So, just as Canopus became superseded by Alexandria, Canopus had itself superseded the extremely ancient Behdet which

## THE ORACLE CENTRES

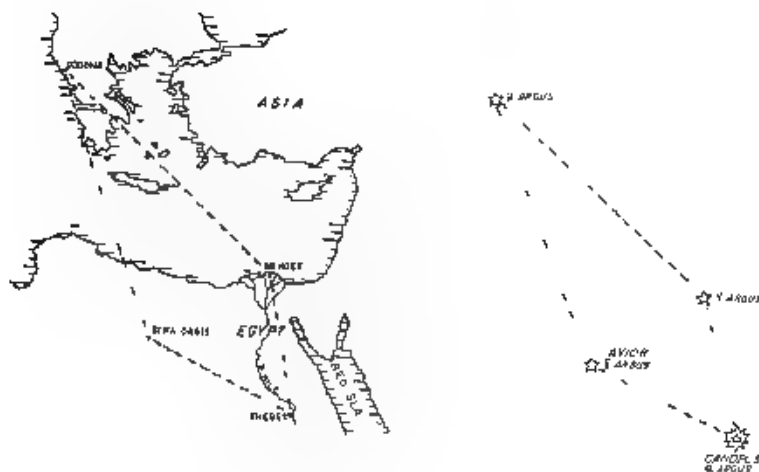


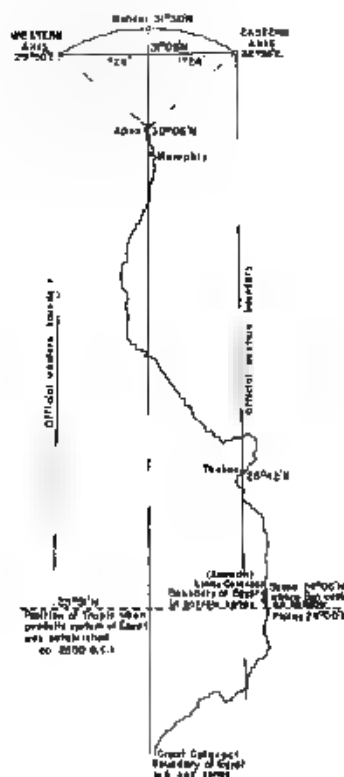
Figure 19. The above geodetic pattern (left) seems to match a stellar pattern of Argo (right)

existed before 3200 BC as the most important city on the Egyptian coast. In our discussion which follows, we must realize that in the times just preceding and during the classical period in Greece the fame that had once attached to Behdet had shifted to Canopus, along with many traditions which were in actuality native to Behdet, which was by then a neglected place which no Greek knew \*

Richard Allen says further of the city of Canopus: 'Our name for it is that of the chief pilot of the fleet of Menelaos,

\* Behdet is on the same latitude as Hebron on the west bank of the River Jordan. In Chapter Four of *The White Goddess*, Graves tells of the Philistines, who captured the shrine of Hebron in southern Judaea from the Elomite clan of Caleb, but the Calebites ( 'Dog-men' ), allies of the Israelite tribe of Judah, recovered it about two hundred years later. 'The Dog-men' are probably connected with Sirius the Dog Star and Hebron is the eastern counterpart of Behdet.

## THE SIRIUS MYSTERY



*Figure 20. Plan of ancient Egyptian geodetic schema based on Behdet*

who, on his return from the destruction of Troy, 1183 BC, touched at Egypt, where, twelve miles to the north-eastward from Alexandria, Canopus died and was honoured, according to Scylax,\* by a monument raised by his grateful master,

\* Scylax was a remarkable voyager and explorer of the fourth century BC, who sailed down the Indus river to its mouth and thence to the Isthmus of Suez and wrote a book about it, quoted by Aristotle

## THE ORACLE CENTRES

giving his name to the city and to this splendid star, which at that time rose about  $7\frac{1}{2}^{\circ}$  above that horizon.' Sir Norman Lockyer in *The Dawn of Astronomy* describes ancient Egyptian temples oriented to the rising of the star Canopus.<sup>2</sup>

Note in the above story of the pilot Canopus that the names of the city and the star are specifically said to have the same origin and that it is from a famous pilot of a fleet, the man at the helm who steers the steering-oar in the lead ship. Once again, in another way, the star (and the place) are identified with the steering-oar, which was the other name for the same star.

Allen brings forward another interesting aspect of the star's name, which will be something familiar to us

The foregoing derivation of the word Canopus is an early and popular one, but another, perhaps as old, and more probable, being on the authority of Aristides, is from the Coptic, or Egyptian, *Kaht Nub*, Golden Earth. Ideler, coinciding in this, claimed these words as also the source of other titles for Canopus, the Arabic *Wazn*, Weight, and *Haqar*, Ground, and of the occasional later Ponderosus and Terrestris. Although I find no reason assigned for the appropriateness of these names, it is easy to infer that they may come from the magnitude of the star and its nearness to the horizon, this last certainly made it the Περὶ γῆς [*Perigēns* 'near the earth'] of Eratosthenes.

Notice how the irrepressible *At Wazn*, 'Weight' and its Latin form *Ponderosus*, keep springing up whenever there seems to be a connection with Sirius.

Allen mentions that 'The Hindus called (Canopus) Agastya, one of their Rishis, or inspired sages, and helmsman of their Argha' which is in striking agreement with the Mediterranean concepts.

Further in line with our previous discoveries, it will be

interesting to note what Allen says of another of the stars of Argo, the star  $\eta$  (*eta*) '(Jensen) claims it as one of the (Babylonian) temple stars associated with Ea, or Is\*, of Eridhu, the Lord of the Waves, otherwise known as Oannes, the mysterious human fish and greatest god of the kingdom'

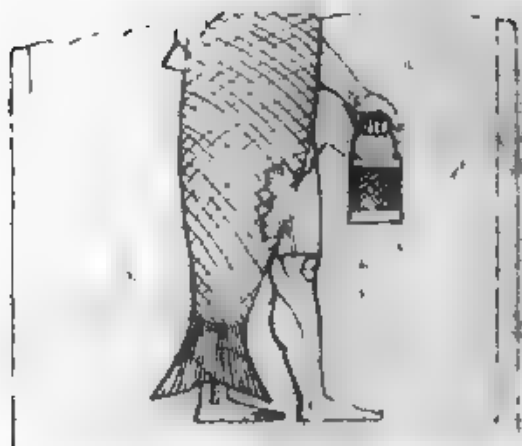
Here we have the amphibious creature Oannes (see later discussion especially in Appendix III, for this Babylonian equivalent of Nommo), identified with the god Enki, who in Sumerian myth did indeed reside at the bottom of the Abzu, or Abyss, in fresh (not salt) water. It was, in fact, the god Enki who assisted man before the flood came by warning the proto-Noah of the Sumerian deluge story to build his ark. He thus fulfilled the function of the special presiding deity of the Hebrews, the Jehovah of the Old Testament. How many Jews know that their god was originally amphibious?

This early Noah or proto-Noah, whom the god Enki warned, was called either Ziusudra (Sumerian) or Utnapishtim (Babylonian), depending on which period of pre-Biblical literature one consults. In the early deluge stories, the proto-Noah in his ark sends forth birds to seek dry land just as does Noah in his ark and rather as Jason sends forth birds to find the way through the clashing rocks. H. W. Parke in his book *The Oracles of Zeus* specifically associates the birds sent forth by Jason with Dodona. Both Dodona and Delphi claimed the 'Greek Noah' Deukalion as having landed his ark on the mountain tops at their locations. Noah himself landed his ark on Mount Ararat, which his bird found for him. We shall see in a little while the importance of these birds and the locations espied by them. But recall now the connections between Dodona and Mount Ararat implied by a common tale of their having both been found by a 'Noah' in an ark who sent forth a bird who found the mountain. It is true that one tale is

\* Ea was his Akkadian name, Enki was his Sumerian name. Eridu was his geodetic city, which was the southernmost of all the Sumerian cities (AT).



plate 78



*Figure 21* The only original excavation drawing which is still preserved in the British Museum of the Assyrian Oannes sculptures excavated at Kouyunjik (in Iraq) by Austen Henry Layard in the mid-nineteenth century. This one shows the bottom half of a large broken bas-relief described as 'Fish Deity' by the excavators. The figure, whether intended actually to represent Oannes or a priest dressed up as Oannes, holds the usual mysterious basket, apparently made of reeds. No one knows what was in the basket! Probably this drawing was preserved because it was omitted from reproduction by the publishers of Layard's books, whereas they took delivery of the rest, which disappeared after being engraved.

purely Greek and the other tale purely Hebrew. Naturally, there cannot be any real connection between Dodona and Mount Ararat. After all, they are probably purely arbitrary locations. It is all myth and fable, isn't it? The Jews and the Greeks were never in contact. There could have been no *liaison* between them. It is all separate hermetically sealed.

cultures with vague fairy-tales and nonsense. Isn't it? Can anyone challenge such a view? Of course not.

So it is interesting that Dodona and Mount Ararat are on the same parallel and have the same latitude.

Furthermore, Mount Ararat has a centre associated with it which served much the same function to the Caucasians as Dodona did to the Greeks. It is called Metsamor. Here is a description of it by Professor David Lang and Dr Charles Burney<sup>3</sup>

Archaeological research during the past half century [they were writing in 1971] has materially altered our concept of the history of literature, science, and learning in Transcaucasia. A key site here is the village of Metsamor, a few miles to the west of Echmiadzin, and within sight of Mount Ararat and Aragatz. Close to the village is a massive rocky hummock, perhaps half a mile in circumference, with outcrops of craggy stone. The hummock is riddled with caves, underground storage vaults, and prehistoric dwellings, and is now seen to have been a major scientific, astronomical and industrial centre, operating in the fields of metallurgy, astrology and primitive magic from a period hardly less than five thousand years ago.

The Metsamor 'observatory' is covered with mysterious, cabbalistic signs. Indeed, hieroglyphic writing in Armenia goes back to very early times, perhaps to the New Stone Age. All over Armenia, we find pictograms or petroglyphs, carved or scratched on rocks, caves and cliff faces, and showing simplified human and animal figures. There is little doubt that these served as means of communication, as well as of ritual and artistic self-expression.

They also describe Metsamor's wide-ranging contacts with the outside world.<sup>4</sup>

Sumerian achievements as pioneers in copper and bronze metallurgy must not be underestimated. The early Transcaucasian cultural zone, though geographically within the Near East, was divided only by the high but narrow Caucasus from the northern steppes, and, once there, nothing could prevent the traders reaching the central European copper-working centres. Thus Georgia, with its neighbouring regions, was perhaps open as much to influences from Europe as to those from the Near East. Transcaucasia may have been not so much an original centre as a region into which metal-working arrived from two different directions, and where, though present in earlier periods in a modest way, it took root and from the late third millennium BC began to develop along distinctive lines, no longer owing its forms to external inspiration. Metsamor gives a hint that, just as earlier in Europe, once foreign merchants had arrived seeking sources of metals, bringing their copper and later their bronze products with them, and explaining, by choice or otherwise, their techniques to the local population, it was no time before a local industry began to arise. If present evidence indeed points to Armenia as the oldest centre of metallurgy in Transcaucasia, it points also to a Near Eastern inspiration.

Many years ago, a reader sent me photocopies of various archaeological reports about Metsamor in Armenian and Russian, but I have never gone to the expense of having them translated. He did tell me, however, that the site contained a religious centre oriented towards the heliacal rising of Sirius, and that the American and Russian archaeologists had concluded that Metsamor was a centre of 'the worship of the star Sirius'. This is one of the many subjects in need of proper funding for an investigation.

\*

It is extraordinary that if you place a compass point on Thebes in Egypt you can draw an arc through both Dodona and Metsamor.

We now return to Allen and his further remarks<sup>5</sup> about Oannes. 'Berossos described Oannes as the teacher of early man in all knowledge; and in mythology he was even the creator of man — and some have regarded him as the prototype of Noah.'

Allen also describes the star Canopus in this way: 'And, as the constellation (of Argo) was associated on the Nile with the great god Osiris, so its great star became the Star of Osiris.' He gives a further application of the title 'heavy' '*The Alfonsine Tables*\* had (for Canopus) *Suhel Ponderosus* ("Among the Persians Suhail is a synonym for wisdom" — and there was also, therefore, a "Suhe. Sirius"), that appeared in a contemporary chronicle as *Sihil Ponderosa*, a translation of *Al Suhail al Wazn*.' Allen then gives several tales indicating that this designation was once applied to another star 'formerly located near Orion's stars' and 'had to flee south', being an apparent admission that Canopus is being called by another star's title. Canopus is south of Sirius (which is 'near Orion's stars'), and so obviously the description of the invisible Sirius B 'fled south' to a likely visible star, Canopus.

Now to return to our projection of the *Argo* on the earth's surface. We put the centre of the stern of the ship at the obvious place — Canopus. (But really slightly altered eastwards to the original city Behdet.)

Now we must consider Dodona. We are told that oak from Dodona was placed 'in the middle of the keel' of *Argo* by Athena. It obviously ran the whole length of the ship. It is also referred to as being in the prow. Allen says of this:

\* Astronomical tables compiled in 1252 in Spain under the future King Alfonso X.

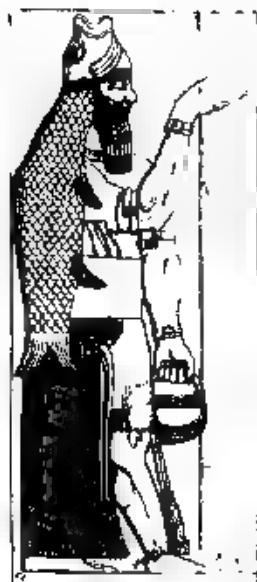


Figure 22. (a) (left), The Babylonian semi-daemon Oannes, a fish-tailed amphibious being from the heavens who, according to the Babylonians, founded civilization on earth. From *Nimrud* (b) (above) An Assyrian wall carving of Oannes, from the royal palace of King Sargon II (reigned 721-705 BC) at Khorsabad (in modern Iraq). Reproduced from

Figure 54 of Joseph Bonomi's *Nineveh and Its Palaces* (London, 1875). He calls it Dagon, using the Phoenician name for Oannes. The original carving shows Oannes surrounded by waves of the sea, which are omitted in the engraving.

Mythology insisted that (the *Argo*) was built by Glaucois, or by Argos, for Jason, leader of the fifty Argonauts, whose number equalled that of the oars of the ship, aided by Pallas Athene, who herself set in the prow a piece from the speaking oak of Dodona; the *Argo* being thus endowed with the power of warning and guiding the chieftains who form its crew. She carried the famous expedition from Iolchis in Thessaly to Aea in Colchis, in search of the golden fleece, and when the voyage was over Athene placed the boat in the sky.

In measuring with the *Argo*'s projection one does so from the site of Behdet which is a bit east of Canopus on the northern Mediterranean coast of Egypt, but it was common classical Greek practice to think of Canopus in place of the forgotten Behdet, as for instance with 'the Canopic Hercules' who went to Delphi and is mentioned by Pausanias as predecessor to the Greek Hercules from Tiryns (an ancient town on a rocky hill in the Argive Plain of Greece, finally destroyed by Argos circa 470 B.C.) who was of much later date. (It is important that the original Hercules was admitted by the Greeks to have been an Egyptian.) In fact, the Delphic oracle itself compares the Greek Hercules most unfavourably with the original Egyptian one – and remember it is said that in the earliest versions of the story it was Hercules, not Jason, who led the Argonauts. Also, it is well accepted today among scholars that Hercules was in many ways a survival of Gilgamesh, with particular motifs and deeds being identical in both heroes.



Figure 23 An ancient Greek gem carving of Argus shaping a piece of the sacred oak of Dodona for the prow of the ship *Argo*

Well, if we project the *Argo* on the earth with the centre of its stern at Canopus (really Behdet) we put the other end at Dodona because the oak in the prow came from there. Canopus-Behdet is named after the stern, and Dodona produced the prow. Therefore we are not merely fantasizing when we project the image of the *Argo* in such a way that the stern is at the stern on earth and the prow is at the earthly source of the prow.

If we then keep the stern at the same spot and swing the boat over a map so that the prow which touched Dodona points towards Metsamor, we discover that the angle made is exactly a right angle of  $90^{\circ}$

Now we get into geodetics, a fearsome subject that involves a bit of bother. It concerns latitudes and longitudes, and most people would run a mile upon hearing those mentioned (sailors and pilots of aircraft excepted). In fact no one is more likely to flee with terror from the subject than an archaeologist. There is almost nothing an archaeologist likes less than being reminded how little he may know about the Earth as a body in space and about astronomy. The average archaeologist is almost bound to be ignorant of even the most elementary astronomical facts. There are many caustic comments on this state of affairs to be found in *The Dawn of Astronomy*, written by the distinguished Victorian astronomer and friend of Sir Wallis Budge, Sir Norman Lockyer,<sup>6</sup> and more recently some severe remarks have been made also by Santiliana and von Dechend in *Hamlet's Mill*.

But we must come now to some extremely interesting further discoveries. Egypt is  $7^{\circ}$  long – in latitude – from Behdet to the Great Cataract. I have reasons for believing that the ancient Egyptians thought of distances of  $7^{\circ}$  as an octave, by analogy with music. Most readers will know that an octave contains eight notes on a scale over a space of seven intervals (five tones and two semitones actually, but let us think only of the seven intervals).

Ancient Mediterranean peoples did indeed know the principles of our musical octave. In the *London Times*<sup>7</sup> an article appeared describing the work of Dr Richard L. Crocker, Professor of Music History, and Dr Anne D. Kilmer, Professor of Assyriology and Dean of Humanities, both at the University of California, Berkeley. The article quoted Dr Crocker as saying 'We always knew there was music in the earlier Assyro-Babylonian civilization. But anti-

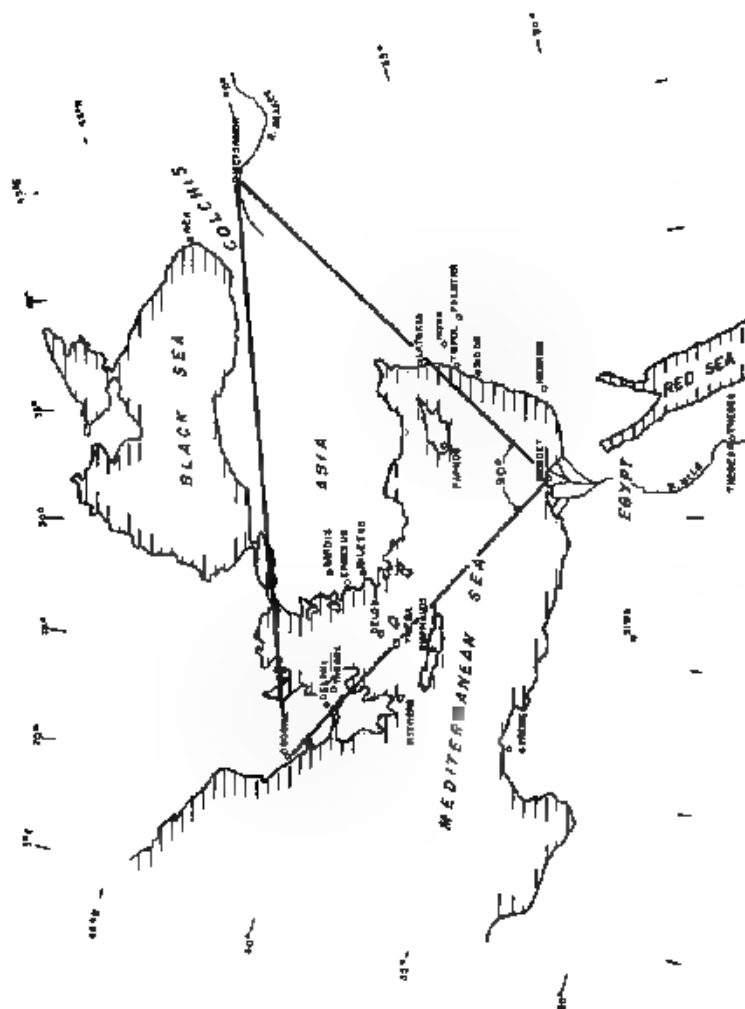


Figure 24 Projection from Behdet



thus, we did not know that it had the same heptatonic diatonic scale that is characteristic of contemporary Western music and Greek music of the first millennium BC.' After fifteen years of research, Crocker and Kilmer demonstrated that some clay tablets from Ugarit on the coast of present day Syria, dating from about 1800 BC, bore a musical text based on our familiar octave. Dr Kilmer summed it up by saying 'It is the oldest "sheet music" known to exist' The two professors even recorded the tune on a reconstruction of an ancient lyre in public, after an interval of only 3,700 years<sup>8</sup> (A commercial record album plus accompanying booklet, entitled *Sounds From Silence Recent Discoveries in Ancient Near Eastern Music* by Anne Kilmer, Richard Crocker and Robert Brown, was put on sale in 1976 by Bit Enki Publications and Records (BTNK 101), California. The recordings are fascinating.)

I believe that the Egyptians laid out a 'geodetic octave' commencing at 1° north of Behdet (to emphasize its separateness from Egypt) and culminating at Dodona. For Dodona is precisely 8° north of Behdet in latitude, and the related oracle centre of Delphi is exactly 7° in latitude north of Behdet (These last two facts were discovered by Livio Stecchini, as will be explained somewhat later.) As we have seen, octaves go back at least to the Sumerians.

I have arrived at this sequence for a geodetic oracle octave (see Fig. 26)

- 8 Dodona
- 7 Delphi (with its famous *omphalos*, a stone navel)
- 6 Delos, the famous shrine of Apollo, once an oracle centre (also with an *omphalos*)
- 5 Kythera (Cythera), a site on the north-east coast (see later); or Thera (Santorini)
- 4 Omphalos (Thenae) near Knossos on Crete (on the Plain of Omphaleion)



*Figure 25* The god Apollo sits on his tripod at the Oracle of Delphi in this ancient Greek vase painting. Beside him the Delphic laurel is growing. In his right hand he holds the mantic bowl into which the priestess, who approaches him with a gesture of welcome, will gaze as she goes into trance. A female attendant stands with a jug of water to refill the bowl as it becomes necessary. The bowl was filled with a hot steaming liquid containing powerful decoctions of narcotic herbs such as henbane, thorn apple and black and white heliobore, which helped induce a prophetic frenzy in the self-hypnotized priestess. The terrible smoke was explained away to the public as 'fumes from the rotting corpse of the monster Python' supposedly oozing up through a chasm under the temple (although modern excavators have proved that there was no chasm). For a lengthy account of how these proceedings worked, of the drug plants, and of the oracular institutions, see my book *Conversations with Eternity*, Rider, London, 1984, on pp. 53, 58 and 59 of that book further illustrations are to be found which relate directly to this one.

- 3 Undiscovered site on Southern or South-western coast of Cyprus' (Paphos?) (Cape Gata?)
- 2 Lake Triton (or Tritonis) in Libya
- 1 El Marj (Barce or Barca)

The ones which I have identified are spaced apart by one degree of latitude from each other in sequence and are integral degrees of latitude from Behdet, which we shall see was the geodetic centre of the ancient world (akin to Greenwich in the modern world) and was also a pre-dynastic capital of Egypt.

What justification have I for speaking of a link between the oracle centres and the musical octave? I have several reasons, and it would be just as well for me to give some slight indications here to make the reader who is justifiably puzzled at this point a little less so.

Graves<sup>9</sup> informs us of some interesting facts about Apollo, who was official patron god of Delphi and Delos (two of the centres on our list): 'In Classical times, music, poetry, philosophy, astronomy, mathematics, medicine, and science all came under Apollo's control. As the enemy of barbarism, he stood for moderation in all things, and *the seven strings of his lute* were connected with the seven vowels of the later Greek alphabet, *given mystical significance*, and used for therapeutic music. Finally because of his identification with the Child Horus, a solar concept, he was worshipped as the sun, whose Corinthian cult had been taken over by solar Zeus' (The italics are mine.) Note also the reference to Horus, whose falcon would have presided over the Colchian dead in their hope of resurrection. In fact, one meaning of *tyrhus* (Carce - 'falcon'), which I did not elaborate on earlier, is 'ring'. I wish to comment in passing that not only was the ring traditionally a solar symbol (as was the golden fleece, and as was the falcon), but the Cyclopes who were one-eyed were really one-ring-eyed. Cyclopes means 'ring-eyed', in fact. Graves says:<sup>10</sup> 'One-eyed Polyphemus' can be traced back to the Caucasus. Whatever the meaning of the Caucasian tale may have been, A. B. Cook in his *Zeus* (pp. 302-23) shows that the Cyclops's eye was a Greek solar emblem.'

The following remarks by Graves then tend to dissociate

Cyclops from Cyclopes, but perhaps this should not be done, in the light of all these new insights. After all, the older Cyclopes were three, wild, and ring-eyed, and sons again of Gaia the Earth goddess just as were the three fifty headed monsters (there is to be much discussion of this later). They would, according to my 'system', be solar too, and 'ring', 'falcon', 'earth-born of Gaia' and solar seem always to go together in the schema. Gaia, indeed, preceded the solar Apollo as presiding deity at Delphi. Not surprising, as Deukalion's ark landed on Mount Parnassus above Delphi (according to Delphic propaganda) and his 'mother' was Gaia, whose 'bones' he threw behind him to people the desolated Earth once again.

It is not only Deukalion's ark that is connected with Delphi. There are connections also with the *Argo*, as we learn from Godfrey Higgins.<sup>1</sup> 'In the religious ceremonies at Delphi a boat of immense size was carried about in processions, it was shaped like a lunar crescent, pointed alike at each end: it was called an Omphalos or Umbilicus, or the ship *Argo*. Of this ship *Argo* I shall have very much to say hereafter. My reader will please to recollect that the *omnixae* or *Δελφύς* (Delphys) is called by the name of the ship *Argo*.'

Other matters which Higgins connects with Delphi are the sacred syllable *om* of the Indo-Europeans which he says 'is not far from the *divina vox* of the Greek. Hesychius,\* also Suidas<sup>†</sup> in voce, interprets the word *omph* to be *Θεία χληδων* (*theia chledon*), the sacred voice, the holy sound and hence arose the *ομφαλος* (*omphalos*), or place of *Omphē*.' He relates all this with sacred music and the traditional sacred name of God which consists of the seven vowels spoken in

\* Alexandrian lexicographer, fifth century A.D.

<sup>†</sup> Now correctly called Suda—a lexicon, not an author, compiled about the end of the tenth century AD at Byzantium.

sequence to form one word, which is the 'not-to-be-spoken word' He says. 'As a pious Jew will not utter the word *Iehue*,\*' so a pious Hindu will not utter the word *Om*.' But whether this is strictly true or not, the sacred quality of the names is undisputed

Higgins says  $\phi\eta$ , *phē*, is the verb root in Greek of *phaō* 'to speak or pronounce' and *phēmi*, 'to say' (I might add that  $\phi\eta\gamma\omicron\varsigma$ , *phēgos*, is the word for oak, as at Dodona, and  $\phi\eta\mu\eta$ , '*phēmē*', literally means 'oracle' Hence *Omphē* means 'the speaking of Om' (At the *phēmē* Dodona the *phēgos* literally practised *omphē* because the oak spoke there )

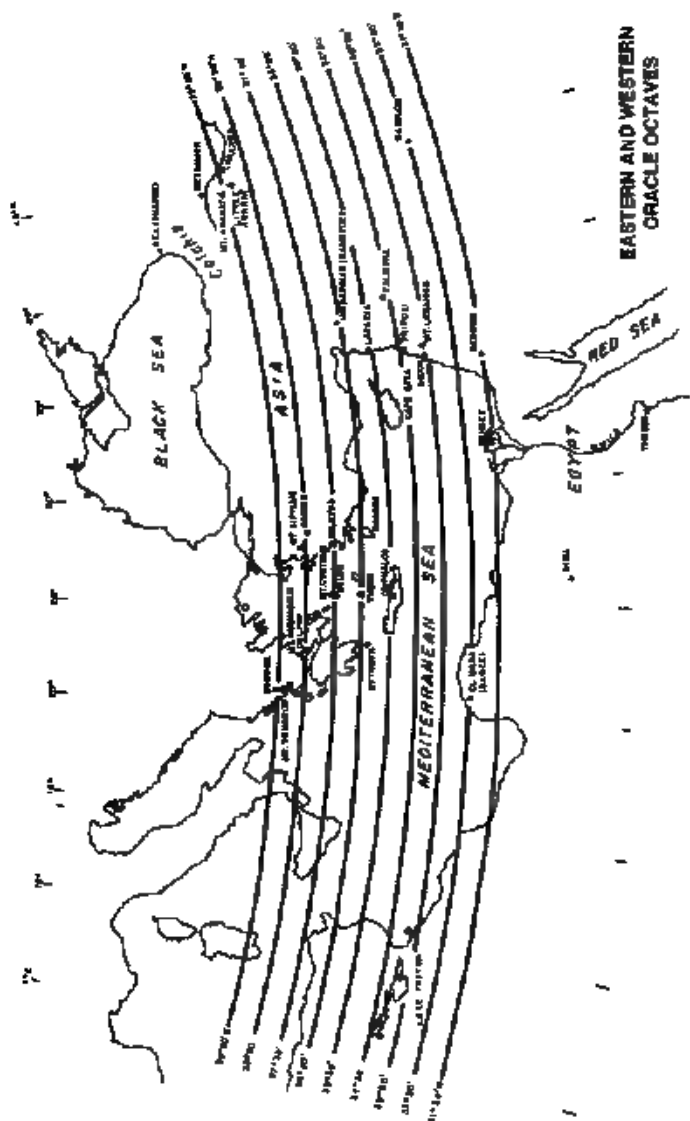
Delphi was said to be the *omphalos*, 'navel', of the world. But it was in fact only one of many.<sup>12</sup> In Figure 26 the reader can see that there is an *Omphalos* near Knossos in Crete which is one of the octave sequence of oracle centres laid out in geodetic integral degrees of latitude from Behdet, pre-dynastic capital of Egypt. A photograph of the *omphalos* stone of Delos may be seen in Plate 21 as well. The seven vowels, the seven strings of Apollo's lyre, the seven notes of the octave (the eighth being a repetition one octave higher of the first, as most people will know), the eight oracle centres in the 'northern octave' of oracles, the seven degrees of latitude marking the official length of ancient Egypt itself, the mystic and unspeakable name of God consisting of the seven vowels run together in one breath—all these are part of a coherent complex of elements forming a system, which also involves cosmic bodies

Before going much further, I should justify my tentative selection of a site on the island of Kythera (Cythera), which is off the southern coast of the Greek Peloponnese, as possibly being associated with the fifth in my series of geodetically sited oracle centres. I found the necessary information while reading Professor Cyrus H. Gordon's remarkable book, *The*

\* i.e. *Yahweh*.

*Common Background of Greek and Hebrew Civilizations.*<sup>11</sup> At the end of Chapter II, Gordon tells us the following

Sometimes cultic centres attracted people from remote areas. Probably the most common cause for such magnetism was an efficacious priesthood, that earned a reputation for helping people in need of practical advice, psychological guidance or medical aid. Cythera began to attract foreigners as early as the Pyramid Age. A stone cap. with the name of a Fifth Dynasty [the chronology of Richard A. Parker gives the dates 2501-2342 BC for the Fifth Dynasty] solar temple [of Pharaoh Userkaf at Abusir] (sp-r') inscribed in Egyptian hieroglyphs, has been found on Cythera. Early in the second quarter of the second millennium, a Babylonian inscription of Naram-Sin, King of Eshnunna, was dedicated on Cythera 'for the life' of that Mesopotamian monarch. [This is one of the reasons for believing that both texts were sent to Cythera in antiquity. Modern deception is unlikely because the Naram-Sin text was found on Cythera in 1849 before the decipherment of cuneiform.] The interesting thing is that both of these texts found on Cythera are religious in character. Herodotus (I 105) relates that the Phoenicians erected a temple on Cythera to the goddess of the heavens. Finally in classical times, Cythera was a great centre of the cult of Aphrodite. The ancient temples were built in the vicinity of Palaopolis around the middle of the eastern shore. I visited the site in 1958 and found it extensive and promising for excavation. Egyptians, Babylonians and Phoenicians came to worship the great goddess there. [At that time the great goddess, Gaia, was also in charge of Delphi, before the usurpation by Apollo.] Ancient cultic installations, carved out of the living rock, can still be seen on a high place at the north end, near the shore. A well, cleared some years ago, had,



*Figure 26* The latitudinal bands – such as those that criss-cross the omphalos stones (see Plate 21 and Figure 33) graphically demonstrate the oracle octaves descending from Dodona to Behdet and from Mount Ararat to Hebron



Figure 27 Engravings of five copper coins of the Roman era showing the omphalos stone at the oracle centre of Zeus Kasios, whose name is written on the bottom of the three coins shown in the top row. This oracle centre was at Mount Kasion, near Latakia, and marked the eastern site of the oracle octave for  $35^{\circ}30'$ . These engravings are reproduced from *Zeus* by A. B. Cook, Cambridge, Vol. II, Part 2, 1925, p. 982. Cook comments, 'Coppers struck by Trajan and Antoninus Pius have on the reverse a shrine with pyramidal roof resting on four pillars and enclosing a sacred stone, which is filleted'. The depiction of a filleted omphalos stone is well known from Delphi and Cook stresses that the stone shown on these coins is definitely not a meteorite or 'thunder stone'. This site is a remote one: 'Mt Kasion, a barren sand-dune adjoining Lake Sirbonis, was famous for its sanctuary of Zeus Kasios'; there was another Mount Kasion in Egypt. And according to Servius, the ancient commentator on Virgil, the sanctuary was founded by a Cretan named Kyparissos. This tallies with the Minoan associations with Dodona, Delphi, and Delos. There is nothing definitely known about the origin of the name Kasios. It was to this site that the rebellious fish/serpent-tailed Typhon (Greek name for the Egyptian Set) was pursued by Zeus in their cosmic conflict, according to the ancient writer Apollodorus (second century BC).



at its bottom, ancient statuary [there are] ancient stone walls. The whole area is covered with ceramics that show the site was occupied in Middle Minoan III (c. 1700-1570), Late Minoan I-III (c. 1570-1100) [Note: 'Late Minoan III (c. 1400-1100) is the Mycenaean Age'] and subsequently in classical times (5th-4th centuries BC).

The problem posed by ancient Cythera has not yet been answered. The island is rather remote from Egypt and Asia for men to have sailed there, for religious purposes alone. And yet it is hard to discover any more practical reason. Cythera is not remarkable for its natural resources. Meanwhile we must reckon with Cythera as a site where all the evidence so far points to its importance as a religious centre with international attraction. Such shrines have remained well known throughout the ages. In classical antiquity, the oracle at Delphi was sought within a wide radius. Today Lourdes attracts from every continent people in need of help that they have not succeeded in finding nearer home.

Cythera thus became a centre for Egyptians and Semites and still other people, from Abasis along the Nile to Eshnunna beyond the Euphrates. Such visitors brought their influence to bear upon the Aegean, and on returning home, carried some Aegean culture with them.

It is gratifying that Cythera is now being excavated by Professor George Huxley for the University of Pennsylvania Museum. [Gordon was writing in 1964.]

So much for Cythera, an alternative possible site is on the island of Thera. Or the two may be linked. Some justification for my guess that site number three would be in the south of Cyprus comes from the famous references to 'Aphrodite Kytherean, even as far as Cyprus', in the ancient literature. Also, Herodotus (Book I, 105) refers to the temple of

Aphrodite Urania at Ascalon in Syria and says ' [it is] the most ancient, I am told, of all the temples of this goddess. The one in Cyprus the Cyprians themselves admit was derived from it, and the one in Cythera was built by the Phoenicians, who belong to this part of Syria ' In the latter (unquoted) part of his last footnote given above, Gordon mentions that 'Phoenicians' is Herodotean language inclusive of the Minoans.

In passing, I might mention that a little island opposite Cythera is called Anti-Cythera and there a famous shipwreck was recovered from which came the miniature mechanical computer dated from the first century BC (concerning which Professor Derek Price of Yale University has written a good deal, including a 'cover story' for the *Scientific American* and his definitive book *Gears from the Greeks: The Antikythera Mechanism - A Calendar Computer from ca. 80BC*, Science History Publications, Neale Watson Academic Publications, New York, 1975). This little computer is one of many survivals of ancient times which demonstrate conclusively that the conventional attitudes today to ancient technology are inadequate, and that we seriously underestimate the early peoples.

Now as for the site of Delos, I will give information here from H. W. Parke's authoritative book *Greek Oracles*<sup>14</sup> which will indicate its importance as an oracle centre in my postulated 'northern octave' of geodetic centres.

The other point which Dodona could urge against Delphi in its favour was that it was the oracle of Zeus himself. Apollo was at most the son of Zeus, inserted somewhat awkwardly into the Greek pantheon. On the face of it his prophecies could not be as significant as the utterances of the father of gods and men. Delphi replied with an elaborate piece of theological propaganda. While not attempting to detract from the supreme position of Zeus,



*Figure 28* An engraving by Romain de Hooghe, published in 1688, showing his conception of the Delphic priestess seated on her tripod and intoxicated by the billowing flames which arise from the chasm beneath

it was argued that Apollo was his chosen prophet. This doctrine appears first in the Homeric *Hymn to Apollo*, but not in the sections connected with Delphi. It is in the Delian hymn where the infant god bursts from his swaddling clothes and cries, 'May the harp and the bending bow be my delight, and I shall prophesy to men the unerring will of Zeus.' In the rest of the same poem there are other references to Delos as an oracle-centre, a function which had lapsed in the classical period. But this part of the Homeric Hymn with its description of the Delian festival evidently dates back to an early stage of the archaic period—probably about 700 BC.

The concept of Apollo as the prophet of Zeus may, then, have started in Delos, but it was certainly taken over and largely developed by Delphi.

Also Delos, though later mainly famous as [Apollo's] birthplace, evidently once had been a centre of divination.<sup>15</sup>

The island of Delos was known as 'the sacred Isle' and was traditionally meant to be immune from war or conquest. As the great scholar W. W. Tarn expressed it, in his article on 'The Political Standing of Delos'. 'Now there is no doubt that the tiny island of Delos, which held a special position in religious life as being the birthplace of Apollo, was for centuries considered a "holy place" . . . the whole island of Delos was considered holy. In the third century [BC] Calpurnius' *Hymn to Delos* calls it the most holy of islands: it is immune from war, and needs no walls, for its wall is Apollo. Delos then was a holy place from the sixth to the second century [BC], possibly tradition made it so from time immemorial, i.e. from the birth of Apollo.'<sup>16</sup>

The historian Diodorus Siculus (first century BC), drawing upon very archaic historical material compiled by his predecessors, records important consultations of the Oracle of Apollo at Delos which prior to the seventh century BC were carried on in the same way that consultations of Delphi were in the later periods which are more familiar to us. For instance:

when the land of Rhodes brought forth huge serpents, it came to pass that the serpents caused the death of many of the natives, consequently the survivors dispatched men to Delos to inquire of the god how they might rid themselves of the evil. And Apollo commanded them to receive Phorbas and his companions and to colonize together with them the island of Rhodes and the Rhocians summoned him as the oracle had commanded and gave him a share in the land. And Phorbas destroyed the serpents, and after he had freed the island of its fear he made his home in Rhodes. At a later time than the events we have described

Althaemenes, the son of Catreus the king of Crete, while inquiring of the oracle regarding certain other matters, received the reply that it was fated that he should slay his father by his own hand. So wishing to avoid such an abominable act, he fled of his free will from Crete. Shortly before the Trojan War Tlepolemus, the son of Heracles, who was a fugitive because of the death of Licymnis, whom he had unwittingly slain, fled of his free will from Argos, and upon receiving an oracular response regarding where he should go to found a settlement, he put ashore at Rhodes together with a few people, and being kindly received by the inhabitants he made his home there. And becoming king of the whole island he portioned out the land.

It is not necessary to know who the above personalities were or to understand the incidents – these examples are merely mentioned to indicate the manner in which the Oracle of Delos held a position similar to that of Delphi.

As regards Omphalos in Crete, another archaic site on our oracle octave, Diodorus Siculus records the following

Rhea, when she had given birth to Zeus, concealed him in Ide, as it is called. And many instances of the birth and upbringing of this god remain to this day on the island. For instance, when he was being carried away, while still an infant, by the Curetes, they say that the umbilical cord (*omphalos*) fell from him near the river known as Triton, and that this spot had been made sacred and has been called Omphalos after that incident, while in like manner the plain about it is known as Omphaleion.<sup>18</sup>

The goddess Athena, who was said to have been born at Lake Triton in Libya (also on our oracle octave), was also said to have been born at the River Triton in Crete, either near to or

actually at the site of Omphalos. We know this tradition from Diodorus Siculus: 'Athena, the myths relate, was likewise begotten of Zeus in Crete, at the sources of the river Triton, this being the reason why she has been given the name of Tritogeneia. And there stands, even to this day, at these sources a temple which is sacred to this goddess, at the spot where the myth relates that her birth took place'.<sup>19</sup> Athena thus seems to have been born at *two* oracle octave sites, but the important point is that her two 'births' are geodetically related to one another and are two degrees of latitude apart.

My contention that the oracle centres of Dodona, Delphi, Delos, Cythera, Knossos, and Cyprus are linked as a series – apart from the obvious facts that they are all separated from each other by a degree of latitude and are integral degrees of latitude from Behdet in Egypt and have demonstrable connections with Egypt in tradition or archaeology – is further cemented by another passage in H. W. Parke's book.<sup>20</sup>

At Delphi, namely the site of the classical shrine of Athena Pronaia on the east of Castalia – as excavation has shown, there was not a settlement but a cult centre going back to Mycenaean times. It is interesting archaeologically that a number of important finds from the earlier archaic periods show clear affinities or actual derivation from Crete. For, as we have mentioned, the Homeric *Hymn to Apollo* ends by describing how Phoebus Apollo then took it in mind whom he would bring of men as his worshippers who would serve him in rocky Pytho.\* Then while pondering he was aware of a swift ship on the wine-dark sea, and in it were good men and many Cretans from Minotaur Knossos who offer sacrifices to the lord Apollo and announce the oracles of Phoebus Apollo of the golden sword whatever he speaks

\* Delphi

in prophecy from the laurel tree'. Some scholars have seen in the evident archaeological links between early archaic Delphi and Crete a basis of fact behind this facade of legend, and it is possible that the cult of Apollo was introduced by sea from Crete.

In the Homeric *Hymn* quoted we find it specifically stated that Minoan Cretans (contemporaneous with ancient Egypt, of course, and who traded with the Egyptians) from Knossos took Apollo to Delphi, the site of an omphalos. And these Knossians are stated to respect oracles. And near Knossos is a site called Omphalos which is one degree of latitude south of the site of Kythera, which is one degree south of Delos, which is one degree south of Delphi.

Parke gives further information.<sup>21</sup> He mentions the connections well known to have existed *between Delos and Dodona* through what are known as 'the Hyperborean gifts' (see below), which were sent to Delos by way of Dodona from the mysterious northern Hyperboreans, whose land is thought by many to have been Britain. In Book II of Diodorus Siculus one finds a description of the Hyperboreans observing celestial objects through what sounds to



Figure 29 Detail of mural from Pompeii reproduced by W. H. Roscher. The omphalos resembles the one at Delos (see Plates 15 and 18). Here the friendly omphalos-serpent is being harassed by a python.

me and some other scholars distinctly like a telescope. In a forthcoming book I have a very great deal to say about the use of crystals and glass lenses in antiquity, and their possible juxtaposition as simple telescopes. But they couldn't have observed SIRIUS B!

Parke tells us 'In the Cyclades Delos had once had an Apolline oracle of importance . . . One can suppose that this institution existed . . . at the end of the eighth century [BC], and may have dwindled away in the seventh century [BC]. By the time when Pisistratus and Polycrates in the latter half of the sixth century [BC] revived the sanctity of Delos, the oracle appears to have already ceased and was not restored.'<sup>22</sup>

It is worthwhile giving some details of the 'Hyperborean gifts', because an account of them is one of the strangest tales to survive from ancient Greece, and it relates directly to our subject. One of the longest studies of them was written by Rendel Harris.<sup>23</sup> Here is a part of what he had to say.

The people who send [Apollo] gifts are real people who have a genuine connexion with him: they have lost him, they have not forgotten him, they find him again by holy embassies and sacred gifts. . . the gifts . . . came such long distances over land and sea, carefully packed in straw, and hidden from the intruding eyes of all except those to whom they were sent. The box was labelled carefully, *Apollo, Delos*, and it was taboo. . . Now let us see what Herodotus says about the sacred gifts that came to Delos in his day [Herodotus, the father of history, lived in the fifth century BC]. He tells us (his information being derived from the priests at Delos) that the sacred things were brought by the Hyperboreans, wrapped in straw, to the Scythians, and that then they passed from tribe to tribe westward to the Adriatic; from thence they are carried south to Dodona, where they pass into Greek hands, from Dodona they are carried eastward again to



the Malian Gulf, and so across to the island of Euboea, and from town to town to Karystos, the people of which town take them to Tenos (passing by Andros), and the people of Tenos take them to Delos. [Herodotus, IV, c 33]

This is a very roundabout pilgrimage but some of the repetition and prolongation of the journey is due to an attempt to avoid mountain ranges. Mt. Cithaeron, for example, is avoided by crossing to Euboea, and working down to the most southerly point of the island at Karystos, where Andros is in sight and Delos close at hand.

The story which Pausanias gives [second century AD.] shows much variation. He tells us that 'at Prasiai (on the coast of Attica) there is a temple of Apollo. Here the first fruits of the Hyperboreans are said to come. The Hyperboreans, I am told, hand them over to the Arimaspians, and the Arimaspians to the Issedones; from thence the Scythians convey them to Sinope; from thence they are borne by Hellenes [Greeks] to Prasiai, and it is the Athenians that bring them to Delos. These first fruits, it is said, are hidden in wheaten straw and no one knows what they are.'

Pausanias knows, however, that the offerings were of the nature of first fruits, and his reference to the bringing of the offerings into Attica is at once explained by the fact that Athens had acquired suzerainty over Delos, so that a deflection of the route from Euboea would be natural. What surprises one is that the offerings are now brought across the Black Sea to Sinope (shall we say from Olbia?), and that from Sinope they pass coast wise to the Bosphorus and so onwards. This is quite different from the route described [700 years earlier] by Herodotus. Yet it is so detailed that it can hardly be set aside, and moreover it makes the sacred route pass through Scythia

to the Euxine [Black Sea] along the amber way. It also puts the Hyperboreans further off, by interpolating two tribes between themselves and the Scythians. If, however, we say that in Pausanias' time the offerings came to Delos by the eastern amber road, it is equally clear that the offerings which Herodotus describes are being carried along the western amber way down to the Adriatic.

An explanation of the change of route was offered by Prof. Ridgeway and endorsed by Frazer. He has made it highly probable that from very remote ages there was a regular trade-route from the Black Sea up the Danube, and across to the head of the Adriatic. This route is the one indicated in the account which the Delians gave to Herodotus of the route by which the offerings came from Southern Russia to Delos. But with the establishment of Greek colonies in Southern Russia this long circuitous route would be exchanged for the direct one through the Bosphorus, the Hellespont and Aegean. This newer and shorter route appears to be the one indicated by Pausanias. He says, indeed, that the offerings came from Scythia (Russia) by way of Sinope, an important Greek colony situated on the southern shore of the Black Sea opposite to the Crimea.<sup>24</sup>

Another factor overlooked by the scholars who have tried to explain the alternative routes is that during the seven centuries between the time of Herodotus and that of Pausanias, the importance of Dodona dwindled, so that a difficult travel diversion in the route which had existed for religious reasons connected with the oracle octave was abandoned because the religious establishment at Dodona under the Romans had fallen into desuetude and had no remaining significance. Of course the later route was the easier and more direct—but the question is: Why was the

more difficult route taken in the first place? It is because the scholars considering this matter have not realized the important archaic connection between Dodona and Delos that they have never been able to make sense of the original route of these mysterious gifts which were transported for thousands of miles across difficult terrain.

It is a daunting prospect to try to set forth at proper length all the complex tangle of information concerning the 'northern octave' and its many links with the Sirius tradition. It is impossible for me to do justice in this book to the subject of the astronomical knowledge of the ancients.<sup>25</sup>

From *Hamlet's Mill* we have a passage which is now relevant. The reader will have to accept on trust that the seven notes of the octave and the seven planets of ancient times were thought of in connection with one another. We cannot here take on the debate concerning early Pythagoreanism versus Neo-Pythagoreanism and the genesis of different concepts of 'harmony of the spheres'. Here is the passage: 'Anc. Aristotle says (*Rhet.* 2.24, 1401a15) that, wishing to circumscribe a "dog" one was permitted to use "Dog star" (Sirius) or Pan, because Pindar states him to be the "shape-shifting dog of the Great Goddess [Gaia]"

The amazing significance of Sirius as leader of the planets, as the eighth planet, so to speak, and of Pan, the dance-master (*choreutês*) as well as the real *kosmokrator*, ruling over the "three worlds", would take a whole volume.<sup>26</sup>

Now this reference to Sirius as 'the eighth planet, so to speak' is an extremely interesting clue. (In fact, there is some evidence to suggest that the ancients knew of the existence of the eighth planet Uranus because the Egyptians could just have managed to observe it in the way suggested by Peter Tompkins in *Secrets of the Great Pyramid*.<sup>27</sup> And I believe both that this was probably the case and that Uranus was sometimes compared to Sirius B because they were both

'invisible' Also, Sirius B orbits Sirius A as a planet orbits a sun, as I have mentioned before for its orbital period is less than that of our own planets Uranus, Neptune, and Pluto. The fact that Sirius B, a star, moves faster than Uranus, a planet is an additional reason for the two to be thought of as similar. Sirius B was additionally compared in some obscure way to the innermost tiny planet Mercury, the nature of whose orbit was symbolized by the human intestines - see Figure 16 for this - and Uranus was the 'octave' expression of Mercury.)

Consider this 'eighth planet' theme in relation to the oracle centres. Dodona is the eighth oracle centre of the 'northern octave'. In music, the eighth note closes the octave by repeating the first note an octave higher. The octave of a note is double its frequency - if you play C on the piano and then play the succeeding seven notes you reach a higher C, double the frequency of the original C - its octave. The 'eighth planet' would therefore repeat the first planet which was Hermes (in Latin, Mercury). Now it was Hermes (Mercury) who supplied the golden ram to Phrixus so that he could make his getaway to Colchis. And it was the oak of Dodona which was fitted into the prow of the *Argo* which returned the golden fleece. During the interval of the fleece's stay in Colchis the fleece rested 'in the grove of Ares [Mars]'. The important points to note are that the fleece went to Colchis under the auspices of the first planet, rested there under the auspices of (the planet's) Mars, and returned under the auspices of Sirius the 'eighth planet' with the oak of the eighth oracle centre in the *Argo's* prow. And we have already seen how *Argo*, if swung through a 90° angle, touches its prow first at Dodona and then points directly at Metsamor near Mount Ararat. But if an extended *Argo* has its prow touch Dodona and its stern at Egyptian Thebes, the *Argo* may be swung to Ararat/Metsamor and touches its prow there too.

Parke says 'On Asia Minor Didyma near Miletus is the

only oracle-centre for whose activity we have some evidence in the sixth century.<sup>28</sup> Miletus seems to be on the same parallel as Delos, just as Sardis is on the same parallel as Delphi.<sup>29</sup> And we have seen that Mount Ararat (having its associated centre at Metsamor) is on the same parallel as Dodona. There is thus a 'north-eastern octave' to correspond to the 'northern octave'. But we shall see later that geodetic points exist over great stretches of territory, marked out from Behdet, the ancient Greenwich. (For instance, an arc swung through Aea in Colchis would pass through Mecca as well, if the compass point were on Behdet. A line from Egyptian Thebes to Dodona intersects the vicinity of Omphalos and Knossos on Crete. The lines connecting Thebes, Dodona, and Metsamor, form an equilateral triangle. A line from Behdet to Dodona intersects Thera. Also, a straight line passes through the three points Behdet, Mecca, Dodona. As for Mecca, I doubt that many Moslem scholars will be at all surprised to learn of these aspects of their holy centre. They know very well that the centre has geodetic aspects and the central shrine of the Kaaba dates from prehistoric times; they say it was established by the prophet Abraham.)

Associations of Delphi with the Sirius tradition are not limited to the Canopic Egyptian Hercules's visit, the carrying of an *Argo* in procession, and the desire to claim the ark of Deukalion instead of Dodona's claiming it (the centres then being rivals for power and attention, as I have said).

Other Sirius-tradition elements present in connection with Delphi are concerned with the *Argo* and the Minyae. It was an oracle from Delphi which stated the golden fleece would have to be brought back to Iocheus from Colchis. It was a series of insistent oracles from Delphi that were ultimately responsible for our knowing the Sirius tradition from the Dogon today, as we will see near the end of the book. For Delphi determined the later fate of the Minyae, and it is their tradition which survives today in the former French Sudan.

The explanation of this will be left to somewhat later

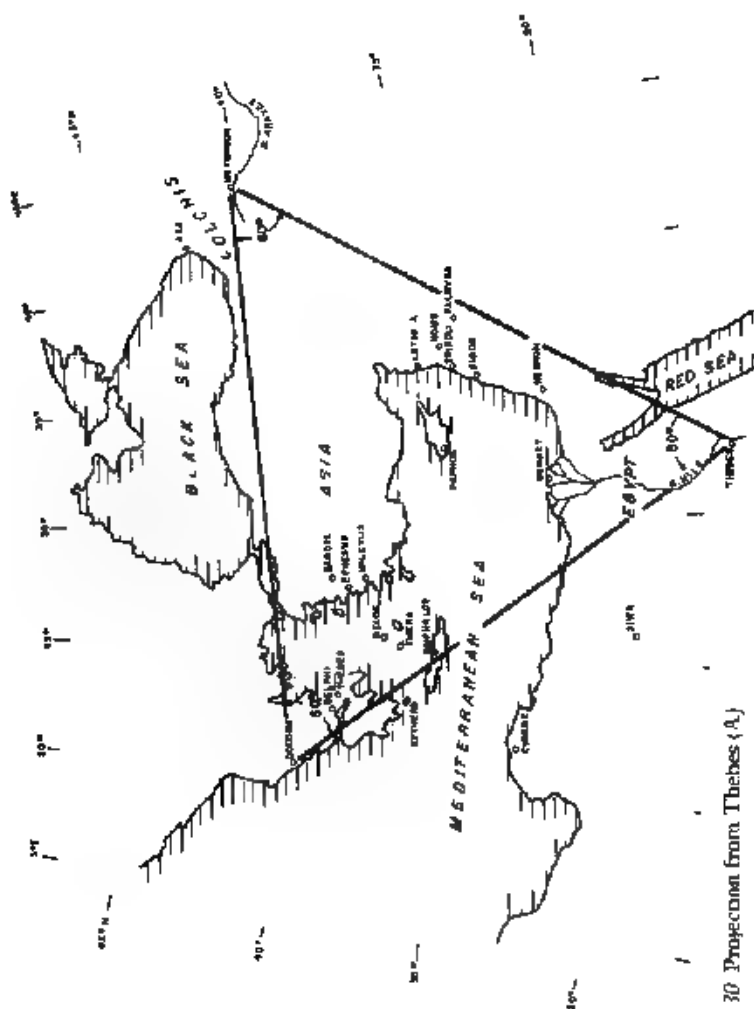
Now, as to the omphalos stone and also Behdet. For these subjects we must turn to the amazing book published in 1971 *The Secrets of the Great Pyramid* by Peter Tompkins (with a scholarly appendix by Livio Stecchini). Tompkins tells us <sup>30</sup>

The prime meridian of Egypt was made to split the country longitudinally precisely in half running from Behdet on the Mediterranean, right through an island in the Nile just northeast of the Great Pyramid, all the way to where it crossed the Nile again at the Second Cataract.

Cities and temples, says Stecchini, were deliberately built at distances in round figures and simple fractions from the tropic or the prime meridian. The predynastic capital of Egypt was set near the mouth of the Nile at Behdet, right on the prime meridian, at  $31^{\circ} 30'$ .

Memphis, the first capital of united Egypt, was again laid out on the prime meridian and at  $29^{\circ} 51'$ , precisely  $6^{\circ}$  north of the tropic.

As each of these geodetic centres was a political as well as a geographical 'navel' of the world, an omphalos, or stone navel, was placed there to represent the northern hemisphere from equator to pole, marked out with meridians and parallels, showing the direction and distance of other such navels. In Thebes the stone omphalos was placed in the main room of the temple of Amon, where the meridian and parallel actually cross. For the ancient Egyptians to have laid out an absolutely straight meridian of  $30^{\circ}$  of latitude from the Mediterranean to the equator over 2,000 miles, and drawn two more, equidistant, east and west, as boundaries of the country [see Figure 20 in this book], must have required an enormous amount of personnel and careful astronomical sightings. Even more sophisticated was their method of establishing longitude, as reconstructed by Stecchini.



**Figure 30** Projection from Thebes (A.)

With the aid of an elementary system of telegraphy, consisting of a series of beacons, the Egyptians, says Stecchini, were able to note what star was at its zenith at a certain moment, and flash the data, via a string of flares, to other observers, so many degrees to east and west. Because of the advanced geodetic and geographic science of the Egyptians, Egypt became the geodetic centre of the known world. Other countries located their shrines and capital cities in terms of the Egyptian meridian 'zero', including such capitals as Nimrod, Sardis, Sasa, Persepolis, and, apparently, even the ancient Chinese capital of An-Yang.

All of these localities, says Stecchini, were set and oriented on the basis of the most exact sightings. The



*Figure 31* This representation of the sacred basket found at Khorsabad (a modern village in Iraq, site of the ancient palace of the Assyrian king Ashurnasirpa.) is important evidence connecting Oannes with the omphalos stone tradition. The basket, which was invariably carried by Oannes, is seen here with the two doves with heads turned away—motif of the omphalos. The basket-work is also seen to resemble the mesh which usually covers the omphalos.



same applies to the centres of worship of the Jews, the Greeks, and the Arabs.

According to Hebrew historians the original Jewish centre of worship was not Jerusalem, but Mount Gerizim, a strictly geodetic point  $4^{\circ}$  east of the main axis of Egypt. It was only moved to Jerusalem after 980 B.C.

The two great oracular centres of Greece – Delphi and Dodona – were also geodetic markers according to Stecchini. Delphi is  $7^{\circ}$  and Dodona  $8^{\circ}$  north of Behdet, the northernmost part of Egypt, on the prime meridian of Egypt.

From this brilliant observation of Stecchini's I got the original idea for my 'northern octave'

Readers who have pondered the strange story of Pharaoh Tutankhamen – whose previous name had been Tutankhaten – and his father-in-law, Akhenaten and mother-in-law Nefertiti – might do well to note that a geodetic-religious dispute lay behind Akhenaten's desire to build a new geodetic capital city, which he did, but outraged the priests in the process. Why were the boundary stones of this city later ferociously mutilated? Because the Pharaoh had tried to establish a variation on the geodetic system of Egypt, and those marker stones represented it quite literally!

In Plates 14 and 16 the reader may see for himself the omphalos stones of Delphi and of Miletus<sup>3</sup> – both of which are spread with 'nets' representing a latitudinal and longitudinal geodetic mesh.<sup>32</sup> It is this mesh which is probably carried at all times by Oannes (see Figures 21, 22 and 31 and Plates 14, 38 and 39) as a 'basket'. For the warp and woof of the sacred basket of Oannes/Dagon – surviving as the *lykenos* basket of Greek Demeter (the Goddess who governed the fruits of the earth, particularly corn (and was mother of Persephone) and who succeeded the Philistine fish-tailed Dagon as agricultural deity, keeping Dagon's 'basket') –



Figure 32 An Egyptian omphalos stone found in the temple of Amon at Napata in Nubia (See *Journal of Egyptian Archaeology*, Vol. III, Part IV, 1916 page 255.) This drawing is reproduced by W. H. Roscher in *Der Omphalosedanke*, Leipzig, 1918, as Figure 6. Roscher says of the stone: 'On the 21st of April, 1917 I received a letter from Professor Gunther Roeder, now Director of the Ptolemaeus Museum in Hildesheim saying that Reisner (Harvard University) had in excavations for the Boston Museum at Gebel Barka (Napata in the Sudan, found a stone in a temple of the Nubian Meroëtic kings which was the omphalos of the Ammon-oracle of Napata.'

represent perfectly the warp and woof of latitude and longitude. The Dogon have traditions of the religious and mythological importance of 'warp and woof' in weaving, and of sacred baskets 'which are not baskets', all of which may be found described in many places in *Le Renard pâle*. For other images of the omphalos stone and its 'basket', see Figure 33.

Figure 32 shows the omphalos stone found by Reisner in the great temple of Amon at Thebes in Egypt. This stone was placed in the main room of the temple where the meridian and parallel actually cross.<sup>33</sup> In Figure 36 is a reproduction of a figure from an Egyptian papyrus of omphalos stones with two doves perched on top. These two doves are the standard glyph meaning 'to lay out parallels and meridians'.<sup>34</sup> They are

the 'two doves' who flew to Dodona from Thebes according to the account of Herodotus.<sup>35</sup> Of course, the two doves are in fact carrier-pigeons. To keep in touch over such enormous distances, and to maintain prompt communication between oracle centres which was essential to the successful operation of a coherent 'world-wide' religious network spread over thousands of miles, the only available means were carrier-pigeons. I am informed that carrier pigeons could fly from Thebes to Dodona in about a day. To travel such a distance oneself by sea and land would take months. Daily communication between the Egyptian religious centre of Thebes and all its oracle 'colonies' would have been transacted by the very carrier pigeons whom we see plainly depicted on omphalos stones by both Greek (see Plate 2.) and Egyptian (see additionally Figure 37) representations and documented clearly by Herodotus. Also, I should imagine such instantaneous 'news coverage' would surreptitiously find its way into the oracular pronouncements at the various centres and exercise a considerable political influence. For after all, there was hardly a king or potentate anywhere in the ancient world who would disregard an oracular order 'from the gods'. Probably the political forces were totally ignorant of the 'hot news line' ticking away secretly in the local oracle centre's temple complex.

Since the original appearance of this book, I have published another book entitled *Conversations with Eternity*, which deals with these matters at considerable length.<sup>36</sup> There is a great deal of textual evidence for networks of carrier-pigeons and carrier-swallows as well, and I describe the way they worked in my chapter on 'The Oracular Establishments' in that book.<sup>37</sup>

I might in passing also mention the remarkable beacon-signalling system described in Aeschylus's play, the *Agamemnon*, first produced in 458 BC at Athens, which purports to describe how the result of the Trojan War was

signalled back to Argos in Greece by a chain of beacon fires on mountain tops. A lengthy study of this was written by J. H. Quincey, and he even published a large map showing that section of the amazing beacon system which extended from Mount Athos to Argos. The bonfire signal went from Mount Athos across the Thracian Sea to Mount Pelion, was relayed from there to Mount Othrys, from there to Mount Messapion, thence to Mount Cithaeron, from there to Mount

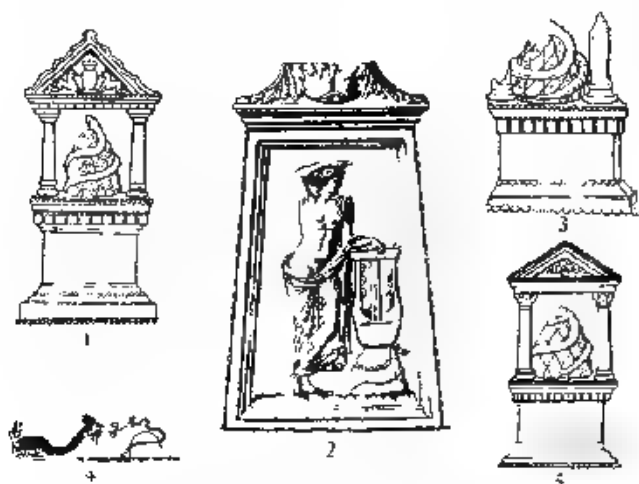


Figure 33 Several depictions of omphalos stones encircled by the oracular guardian serpent. Numbers 1, 3 and 5, which are Etruscan, are of particular interest because they show clearly the intersecting latitude and longitude lines which were marked on the globe by the oracle centres. Number 2 is Roman, excavated in the baths of Titus, by which time depictions of omphalos stones were mere subjects for art, as is the case with Number 4 from Pompeii, for which see Figure 29. Reproduced from *Neue Omphalosstudien* [New Omphalos Studies] by Wilhelm Heinrich Roscher, Leipzig, 1915, Plate IV.

Aegaleos, from where it was transmitted to Arachnaeon and final  $\gamma$  to Argos.<sup>38</sup> This practical use of mountain tops also serves as a salutary reminder of just how important mountain tops were to the ancient peoples. If it were not for the evidence preserved indirectly by the playwright Aeschylus, this particular mountaintop signalling network would forever have been unknown to us. Equally the oracular mountaintop networks had been forgotten until now with their importance for the measuring of the globe by marking latitude lines and their religious importance as 'navels of the earth' which connect the above with the below – so important to ancient religions.

I realize that acknowledgement of all these facts is bound to evoke howls and cries of anguish from any of those archaeologists to whom a drastic revision of their ideas is more painful than would be an amputation of all their limbs without an anaesthetic. Such are the hazards which go with the addictive and opiate pleasures of submersion in a body of orthodox theory.

As the philosopher David Hume pointed out concerning the revolutionary discovery of the circulation of the blood by William Harvey: 'It is remarked that no physician in Europe who had reached forty years of age ever, to the end of his life, adopted Harvey's doctrine of the circulation of the blood, and that his practice in London diminished extremely from the reproach drawn upon him by that great and signal discovery. So slow is the progress of truth in every science, even when not opposed by factions or superstitious prejudices!'<sup>39</sup>

It should be strongly emphasized that Dodona and Mersamor/Ararat are equidistant from Egyptian Thebes. The Greek ark landed at Dodona and the Hebrew ark landed at Ararat. The process of 'landing an ark', therefore, consists of starting at Thebes and going north to either of the two places which are 8 degrees of latitude northwards and which are joined to each other by a distance equal to their distances

from Thebes. That may sound complicated. The fact is that an equilateral triangle is formed by the lines joining Thebes with Dodona and Ararat. These facts cannot possibly be an accident. There cannot be supposedly separate Greek and Hebrew traditions giving the landing points of the ark in their respective regions of the world, which then both turn out by chance to be equidistant from Thebes and the same distance from each other as well as on the same latitude. Since Mount Tomaros at Dodona and Mount Ararat are both 'landing sites' for an ark, this must mean that the tip of the prow of the ark literally does touch either of them when projected on the globe from Thebes. This may be seen clearly drawn by a cartographer in Figure 30.

Also founded from Thebes by flying doves, according to Herodotus,<sup>40</sup> was the Oracle of Ammon in Libya, known to be at the Oasis of Siwa. In Figure 19 we may even see a comparison of the line patterns made by joining Thebes, Dodona, and Siwa with each other, with the line patterns formed by joining certain stars in the constellation of Argo together. The pattern is seen to be identical. The site of Siwa may have been chosen simply to display this. In both instances we have the helm of the *Argo* as the starting point. In the celestial pattern we start from the star Canopus, identified with the *Argo's* helm; and in the geodetic pattern we start with Thebes, which is the site for the global *Argo's* helm when projected either to Dodona or Ararat. But there is another means of projecting the *Argo*, using Behdet, to convey other meanings—bearing in mind always the interconnecting relationships of the sites, with Behdet equidistant from both Siwa and Thebes, and also on the northernmost point of Egypt and (see Figure 20) on the prime meridian dividing Egypt as demonstrated by Livio Stecchini.<sup>41</sup>

When the helm of the *Argo* is placed at Behdet (near the geographical Canopus) rather than at Thebes, with the prow

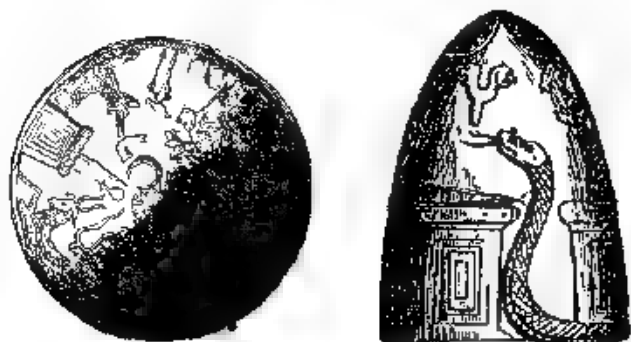
touching Mount Ararat, if we swing the prow across to Dodona through an arc of exactly  $90^{\circ}$  (a right angle), we find that the prow is then too long and must be shortened. In fact, for this extraordinary point, documentary evidence actually exists in a Babylonian text. In Chapter Four we cited the passage in another context, and I will here return to it. It is from the brief Sumerian epic poem 'Gilgamesh and Agga', of extreme antiquity, the surviving tablets preserving it dating from the first half of the second millennium B.C. This Sumerian poem contains, within the framework of what seems to be a local political diatribe a certain bizarre core of material, which no scholar has ever satisfactorily interpreted.<sup>42</sup> (The political aspect of the poem has, in my opinion, been over-emphasized due to Jacobsen and Kramer's understandable excitement at finding in the poem actual evidence of the existence 4,000 years ago of a bicameral parliament, which Kramer wrote up as one of the world's 'firsts' in his excellent book, *History Begins at Sumer*.)<sup>43</sup>

The poem mentions (line 104) a 'fleeing bird' which I believe may be a reference to the carrier-pigeon network which we have just discussed. But the most important elements in the poem seem to me to be two apparently contradictory statements:

- (1) 'The prow of the *magurru*-boat was not cut down' (line 80)
- (2) 'The prow of the *magurru*-boat was cut down' (line 98)

In Chapter Four I discussed why the *magurru*-boat and the *magun*-boat of another poem were in fact that boat which was later known as the *Argo*.

I believe that statement (1) refers to the *Argo* as projected from Bendet to Ararat, and that statement (2) refers to the projection of the *Argo* from Bendet to Dodona. The latter requires the cutting down or shortening of the prow lest the *Argo* extend beyond Dodona.



*Figure 34 (left)* The design carved onto the Babylonian omphalos. Rawlinson suggested that the design was of a zodiac. He thought it obvious that the figures were of constellations. It would seem definitely to be a star-map, but it is not necessarily true that the intention is to represent the sky accurately. Attempts to interpret such complex maps (the Egyptian zodiac of Denderah being a notorious example) usually fall short, so I will not here attempt the feat.

*Figure 35 (right)* A Babylonian omphalos stone (from Rawlinson, A flattened view of its entire conical design is seen in Figure 34.

As long as the prow was not cut down in 'Gilgamesh and Agga', we find that 'The multitude did not cover itself with dust' in mourning. For the projection was still extended over the north west of Mesopotamia, the Sumerian homeland being at least in the general vicinity. The Behdet Ararat line actually intersects the famous oracle centre of Hierapolis (the name means 'priest city')<sup>44</sup> which I propose as the fifth eastern oracle centre at 36° 30'.

The poem says also, as long as the prow is not cut down, that 'The people of all the foreign lands were not overwhelmed'. In other words, the projection did not fall



over foreigners such as those living in Greece. It did not literally 'overwhelm' people of foreign lands, meaning over shadow or pass over them.

However, when the prow was shortened, the projection of *Argo* left Mesopotamia altogether, and then 'The multitude covered itself with dust and the people of foreign lands were overwhelmed'. It is at this point that Gilgamesh says to Agga, 'O Agga, the fleeing bird thou hast filled with grain' (in other words, fed the carrier-pigeon in preparation for his flight to another and different oracle centre—namely Dodona rather than Metsamor). The entire poem is based round a repeated refrain which Kramer calls a riddle,<sup>45</sup> and which concerns the digging and completing of wells, of 'the small bowls of the land', and wishes 'to complete the fastening ropes'. At this point only a Sumerian scholar can tell us whether there are any other shades of meaning or alternative readings which might make the passage clearer, following the clue that 'the fastening ropes' may refer to the rope-like mesh which we see, for instance, on the omphali of Delphi and Delos. Can 'the small bowls of the land' be either geodetic points or their markers, the omphalos stones themselves, which are like small bowls? Could 'small bowls' be an accepted expression for omphali in Sumerian parlance? Answers to these questions are entirely beyond the competence of any but a dozen or so scholars. Even experts in the Akkadian language cannot help us here, with non-Semitic Sumerian. And even answers from one of the experts might be wrong through human error. Sighing, therefore, at the difficulty of our subject-matter, let us look again at Egypt.

Stecchini says:<sup>46</sup> 'Because Egyptologists have ignored the issue of geodetic points and of the linear units, the figure of the revolutionary Pharaoh Akhenaten has turned out to be the most mysterious and controversial in the long history of the Egyptian monarchy.' He then makes some extremely critical remarks about the archaeologist Cyril Aldred (author

of *Akhenaten Pharaoh of Egypt a New Study*, London, 1968) and others and continues

Because they have resisted accepting the solidly documented facts, established scholars have devoted their energies to debating theories such as that Akhenaten was impotent, was a practising homosexual, or a woman masquerading as a man, there are historians who profess to be informed about the intimate relations between him and his wife, the beautiful Nefertiti. Since the picture of Akhenaten has remained indefinite and blurred, scholars have used it to project their own emotions. Those who do not like Akhenaten present him as a psychopath and dispute about the clinical definition of his illness. If instead of trying to imagine what were the hieroglyphic notes of the psychoanalyst of the royal family, we consider the documented facts, the most important action in the revolutionary reign of Akhenaten proves to be the establishment of a new capital for Egypt, the city of Akhet Aten, 'Resting-point of Aten'. The miles-long remains of the buildings of this city have been found and excavated in the locality known today as Tell el-Amarna. During the reign of Akhenaten a substantial percentage of the national resources was dedicated to the construction of this city.

Scholars of the last century, who had not yet adopted the psychologizing fashion, at least recognized the political meaning of the shift in the location of the capital of Egypt. Akhenaten intended to cut at the root of the power of the priests of the Temple of Amon in Thebes, who through their control of the national oracle, identified with the god of this temple, had usurped the royal functions. But what these scholars did not know is that the Temple of Amon was the geodetic centre of Egypt, the navel of Egypt, being located where the

eastern axis ( $32^{\circ} 38'$  east) crosses the Nile, at the parallel which is at  $\frac{1}{2}$  of the distance from the equator to the pole ( $25^{\circ} 42' 51''$  north), and that the god Amon was identified with the hemispheric stone which marked this point

The new city which was intended to replace Thebes as the capital and geodetic centre of Egypt was planned in a position which seems undesirable in terms of what we would consider the function of a capital city. Some scholars have interpreted this fact as further evidence of the mental derangement of its founder. The new capital for the god Aten, who was raised to the status of the one true god, was set at latitude  $27^{\circ} 45'$  north, at the middle point between the northernmost point Behdet and the southern limit of Egypt at latitude  $24^{\circ} 00'$  north.

Akhenaten wanted to prove that Thebes could not properly claim to be the geodetic centre of Egypt and that he had chosen the geodetic centre conforming to an absolutely rigorous interpretation of *maat*, the cosmic order of which the dimensions of Egypt were an embodiment. In order to follow absolutely exact standards of measurement, he reverted to the pre-dynastic geodetic system which counted in geographic cubits starting from Behdet. In terms of the system based on the pre-dynastic capital of Behdet, there could be no question that Akhet-Aten is the 'true and just nave' of Egypt.

This conclusion implies that one should re-evaluate the entire historical role of Akhenaten, taking as the starting point what he himself considered the initial step in his program to establish true and just conformity with *maat*. There is a possibility that his revolutionary reforms, which extended from religion to art and family relations, were understood as a general return to pre-dynastic ideas and practices.

Note the fact that Thebes had established itself as the 'navel' of Egypt but not on the basis of the 'Behdet system' which Akhenaten apparently tried to revive. It shows how ancient the 'northern octave' must be if it were based on the 'Behdet system' whereas Thebes was not. The clear involvement of Thebes in the 'northern octave' system is not exclusive but is complementary to that of Behdet. In Herodotus, Book Two (54) we find this significant tale

At Dodona the priestesses who deliver the oracles have a story two black doves, they say flew away from Thebes in Egypt, and one of them alighted at Dodona, the other in Libya. The former, perched on an oak, and speaking with a human voice, told them that there, on that very spot, there should be an oracle of Zeus. Those who heard her understood the words to be a command from heaven, and at once obeyed. Similarly the dove which flew to Libya told the Libyans to found the oracle of Amon which is also an oracle of Zeus. The people who gave me this information were the three priestesses at Dodona Promeneia the eldest, Timarete the next, and Nicandra the youngest and their account is confirmed by the other Dodonaean who have any connection with the temple.

It is really interesting to see how chummy Herodotus was with the priestesses of Dodona. Just how vividly accurate the Dodonaean story really is, will in a moment become even more clear. But as for the question of Thebes versus Behdet, tied in as it is with the Akhenaten question, I beg to bow out of that controversy. Put me down as having 'no opinion'.

We must note Stecchini's remarks about Delphi as follows <sup>42</sup>

The god of Delphi, Apollo, whose name means 'the stone', was identified with an object, the *omphalos*,

'navel' which has been found. It consisted of an ovoidal stone. The *omphalos* of Delphi was similar to the object which represented the god Amon in Thebes, the 'navel' of Egypt. In 1966 I presented to the annual meeting of the Archaeological Institute of America a paper in which I maintained that historical accounts, myths, and legends, and some monuments of Delphi, indicate that the oracle was established there by the Pharaohs of the Ethiopian Dynasty. This is the reason why the Greeks portrayed Delphos, the eponymous hero of Delphi, as a Negro.

Stecchini also explains his theory that the oracles originally functioned through the operations of computing devices.

An object which resembles a roulette wheel, and actually is its historical antecedent, was centred on top of the *omphalos*. The spinning of a ball gave the answers, each of the thirty-six spokes of the wheel corresponded to a letter symbol.

In studying ancient computing devices, I have discovered that they were used also to obtain oracular answers. This is the origin of many of the oracular instruments we still use today, such as cards and ouija boards.

The roulette wheel of Delphi originally was a special kind of abacus for calculating in terms of angles.

The following information from Stecchini is also both surprising and informative with regard to the story of the *Argo*, *Colchus*, etc.<sup>48</sup>

Very revealing is that a base line was marked along parallel 45° 12' north on the north side of the Black Sea. This base line started from the mouth of the Danube, cut across the Crimea, and ended at the foot of the Caucasus.

## THE SIRIUS MYSTERY

Beginning from this base, Russia was surveyed for a length of 10 degrees, along with the three meridians which formed the three axes of Egypt, up to latitude  $55^{\circ} 12'$  north. The river Dnieper was understood to be a symmetric counterpart of the Nile, running between the same meridians. Key positions along the course of the Dnieper were identified with corresponding key positions along the course of the Nile up to the point of transferring Egyptian place names to Russia. The information about the existence of this geodetic system is provided by the description of a map of Russia which is based on it. The description of the map indicates that it was used at the end of the sixth century B.C., but the map may be older, in any case there are other sources of information about the base line which indicate that it was marked in very early times.

In Tompkins and Stecchini's marvellous book<sup>49</sup> there are some first-rate photographs and drawings of stone omphalos navels which are extremely helpful in trying to understand all these matters. It makes all the difference to see the fantastic nature of these objects, representative as they are of a highly



Figure 36.

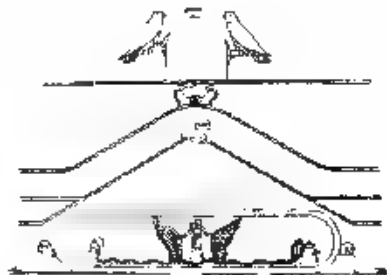


Figure 37

developed ancient science which until recently was completely unknown. These are reproduced here in figures 36 and 37 and Plates 14-19.

It is also interesting to note, by way of relation with the ark of Noah, the ark of Ziusudra (or Utnapishtim) the ark of Deukalion, and the *Argo* - all of whom sent forth birds over the water (like those birds from Thebes as we know) - that the standard Egyptian hieroglyph for the act of laying out of parallels and meridians is, as we have seen, two pigeons facing each other. Stecchini says: 'In the religion of the Old Kingdom (of Egypt), Sokar is an important god of orientation and of cemeteries. The god and the geodetic point were represented by the stone object which the Greeks called *omphalos*, 'navel', it is a hemisphere (the northern hemisphere) resting on a cylinder (the foundations of the cosmos). Usually on top of Sokar, as on top of any *omphalos*, there are portrayed two birds facing each other, in ancient iconography these two birds, usually doves, are a standard symbol for the stretching of meridians and parallels.'

Hence we see even further Egyptian connections with the Greek and Near Eastern tales in which the birds are let fly and the ship finds the oracle centre's mountain.

Associated with oracle centres was probably also a 'tree-code'. Dodona had its oak. Delphi was associated with laurel. And we learn from the *Elegies* of the sixth-century BC poet Theognis (5-8) and from the Homeric *Hymns* that the oracle centre of Apollo at Delos was specifically associated with the palm tree. Any site in the Lebanon, of course, such as Mt Lebanon and its possibly related centre of Sidon, would be associated with the famous cedars, known to us also from the *Epic of Gilgamesh* as intimately connected with Gilgamesh's exploits at 'Cedar Mountain' in the Lebanon. In putting together a schema of trees we are faced with considerable problems, but this is at least a beginning. A great deal of information on 'tree alphabets' is to be found in Robert



*Figure 73. A mythological scene set at an oracle centre, from a painting on an amphora excavated at Rave. At the top right the god Apollo sits with his bow, indifferent to the fact that the young warrior, Neoptolemos (centre, sword in his hand), son of Achilles, has been wounded and is about to be dealt his death-blow in a quarrel. The palm tree motif of Delos/Miletus, rather than the laurel of Delphi, is prominent on the right, and in the background stands a temple with its decorated ivory doors open. A woman, probably a Pythian priestess, top left starts back in horror. The main interest of the scene is the detailed depiction of the Delphic omphalos stone in the centre foreground. It is covered ('filleted') with a drapery of strands to represent the longitudes and it is horizontally divided into eight evenly graduated latitude bands, corresponding with the oracle octave scheme. It sits in a mount representing what is evidently metal curling leaves, as if it were a bud which had arisen from the Earth.*



Graves's book *The Greek Myths*<sup>50</sup> and even more so in his *The White Goddess*.<sup>51</sup> The willow was associated with the Colchian cemetery and with the island of Aeaea of Carce (the location of which is not known), but particularly it is connected with the island of Crete in tradition. But this subject will have to be tackled at some other time, lest I blow this book up into a puff ball of miscellaneous odds and ends. We do know from Robert Graves that the oracle centre of Hebron — which is on the same latitude as Behdet and seems to be its eastern counterpart — was connected with the tree *sant*, or wild acacia, 'the sort with golden flowers and sharp thorns'. It is 'the oracular Burning Bush in which Jehovah appeared to Moses', Graves adds. 'The acacia is still a sacred tree in Arabia Deserta and anyone who even breaks off a twig is expected to die within the year'.<sup>52</sup>

Its symbolism for the Sirius mystery is an act of pure genius, and is graphically elucidated by Theophrastus:<sup>53</sup> 'There are two kinds, the white and the black, the white is weak and easily decays, the black is stronger and less liable to decay.' A perfect symbol of the two stars, the 'black' Sirius B being 'strong' for its size compared with the white Sirius A. Also of the willow (fourth centres), Theophrastus tells us.<sup>54</sup> 'There is that which is called the black willow — and that which is called the white. The black kind has boughs which are fairer and more serviceable. There is a (dwarf) form.'

# THE SIRILS MYSTERY

## CHART OF THE

WESTERN CENTRE	EASTERN CENTRE
8. Dodona (Mt Tomar os)	Meisamor (Mt Ararat)
7 Delphi (Mt Parnassus)	Sardis (Mt Sipylus)
6 Delos (Mt Cynthus)	Miletus (Didyma, also known as Branchidae, its associated oracular centre) Mt Latmus
5 a. Somewhere on north-east coast of Cythera?	Hierapolis (Bambyce)
b. Rhodes?	
c. Thera on Island of Thera?	
(If so, destroyed by the volcano)	
4. Omphalos (Thesae) near Knossos on Crete	Mt Kasion (near Latakia) seat of Zeus Kasios, coins survive showing an omphalos there (A. B. Cook II. 982)
3 Somewhere on south coast of Cyprus? (associated with Paphos? Akrotiri? Cape Gata?)	near Tripoli? Palmyra?
2 Lake Tritonis (also known as Lake Triton) in Libya/Tunisia	Sidon (Mt Lebanon)
El Marj (Barce) Libya	Babylon
1. Behdet	Hebron

*Note* At one degree of latitude north of Dodona and Ararat is the mystery centre of the Cabeiri on the island of Samothrace

# THE ORACIF CENTRES

## ORACLE OCTAVES

TREE-CODE	'PLANET'-CODE	DIVINITY THIS
oak (phēgos)	Saturn <sup>2</sup>	Mankind born from stones ('bones of Earth') at Dodona
laurel	Sun <sup>2</sup>	Mankind born from stones at Delphi according to rival tradition)
palm	Moon (Artemis was born first, not Apollo)	Artemis (Diana) and Apollo born on Lesbos
?	Mars <sup>2</sup>	?
willow (according to Pliny a willow grew out of the Cretan cave where Zeus was born)	Jupiter	Zeus (Jupiter) was born on Crete
cypress (the word cypressus is derived from Cyprus)	Venus	Aphrodite (Venus) born at Cyprus
cedar	Mercury (as in Egyptian means both 'cedar' and the planet Mercury)	Athena (Pallas) born at Lake Tritonis
?	?	?
wild acacia	Earth <sup>2</sup>	

## Notes

- 1 *Star Names*, op. cit., p. 67
- 2 Lockyer Sir Norman, *The Dawn of Astronomy*, London, 1894 (Reprinted in the 1960s by MIT Press in U.S.A., introduction by Prof. de Santillana)
- 3 *The Peoples of the Hills. Ancient Ararat and Caucasus*, London, 1971, p. 226
- 4 Op. cit., p. 73
- 5 Allen, *Star Names*, op. cit., p. 73
- 6 See Note 2
- 7 7 March 1974
- 8 A week later on 4 March, a letter appeared in *The Times* from Brian Galpin claiming that his father, Canon F. W. Galpin, had previously established the certain antiquity of the heptatonic diatonic scale in his book *Music of the Sumerians, Babylonians, and Assyrians* (Cambridge University Press, 1937). A month after this, on 15 April 1974, a letter appeared in *The Times* from Dr Crocker and Dr Kilmer themselves, in California which was long and not particularly clear. It seemed to be trying to acknowledge Professor Gurney of Oxford for some assistance and condemning Canon Galpin for reaching his conclusions on a different basis from themselves. Crocker and Kilmer obviously aimed at clearing up some misunderstandings, but only succeeded in muddying the waters (at least the letter befuddled me).
- 9 *The Greek Myths* 21, 0
- 10 *Ibid.*, 170.3
- 11 Higgins, Godfrey, *The Apocalypse*, New York, 1927 Vol. I Book III, Chapter 2 section 4
- 12 According to the Dogon, Sirius is the navel of the world. See *Le Renard pâle*, pp. 324-5
- 13 Op. cit.
- 14 Parke, H. W. *Greek Oracles*, (Hutchinson paperback), London, 1967 p. 38.
- 15 *Ibid.*, p. 32
- 16 Tarn, W. W. 'The Political Standing of Demos', *The Journal of Hellenic Studies*, London, Vol. XLIV, 1924, p. 43
- 17 Diodorus Siculus, *The Library of History* Book V, 58-9, translated by C. H. Oldfather, Loeb Classical Library, Harvard University Press, Vol. III, 970, pp. 257-61
- 18 *Ibid.* Book V 70, pp. 285-7
- 19 *Ibid.* Book V 72, p. 293
- 20 Parke, op. cit., pp. 33-4

## THE ORACLE CENTRES

- 21 Ibid pp 94-5
- 22 Ibid p 94
- 23 Harris, Rendel, 'Apollo at the Back of the North Wind' *The Journal of Hellenic Studies* London, Vol. XLV, 1925, pp 229-42
- 24 Ibid pp 233-6
- 25 I refer the reader who suffers from a desperate urge to purge his ignorance to that magnificent work by Sir Norman Lockyer, *The Dawn of Astronomy*. His book should be required reading in all schools, even though it becomes quite technical in places (which the non-technical reader is well advised to skim over quickly). This book was published in 1894 in London by Cassell, but at the instigation of Professor Santilana, has been brought out again by MIT Press in America in the 1960s (see Note 2).

Of course another excellent, perhaps essential, book on the subject is Santilana and von Dechend's *Hamlet's Mill* (see ch. 4, n. 14). Though it is a long book, the authors admit it amounts only to a preliminary essay, and it is a good deal more confusing to read than it should be. In fact, the authors have frankly let their material overwhelm them, but they were coping with material on a far grander scale than Lockyer, and it was like trying to hold back a tidal wave. They have opened up an entirely new field for modern scholars and they may wear the badge of the pioneer and perhaps the pioneer's wife as well.

- 26 *Hamlet's Mill*, op. cit. p. 286.
- 27 Tompkins, Peter, *Secrets of the Great Pyramid*, Harper and Row, New York-London 1971. Appendix by Livio Stecchini.
- 28 Parke op. cit. p. 95.
- 29 Livio Stecchini mentions '... a number of Greek accounts which associate Delphi with Sardis, the capital of the kingdom of Lydia in Asia Minor, which is on the same parallel (38° 28' north)', p. 349 (Stecchini's Appendix, in Tompkins, op. cit.). He says that the mountain associated with this geodetic centre is Mount Sipylus, north-east of Smyrna (now Izmir). See Pausanias III. xiii. 4 and p. 13 of Garstang, John, *The Syrian Goddess*, London, 1913. Mt Sipylus boasts an extremely ancient gigantic carving from the living rock of the Great Goddess whose main centre came to be Hierapolis, another oracle centre in the series. The Great Goddess as Gaia (to the Greeks) was the original patroness of Delphi before the usurpation by Apollo ('... the earth-goddess was the original female deity ... in Late Mycenaean times ... there may have been an oracle as part of the cult ... the arrival of Apollo as a god of divination was originally a hostile intrusion ...' p. 36, Parke, op. cit.). I believe that Malatya (Malatya), further inland than Sardis on the same parallel, may be connected somehow with Delphi and Sardis as well.

## THE S H I L S MYSTERY

- (obviously more with Sard than Delphi). For this, see Garstang, pp. 14-15.
- 30 See Notes 27 and 29.
  - 31 See also Appendix 4.
  - 32 It is such a mess to which the Dogon presumably refer when they speak of the basket which is not a basket. See *A Sudanese Sorcery System* by Griaule and Dieterlen (Appendix I).
  - 33 Tompkins, op. cit., p. 182.
  - 34 Ibid. p. 298.
  - 35 Herodotus, *The Histories*, Penguin paperback, London, 1977, p. 124 (Textual reference: Book II, 54-9).
  - 36 Temple, Robert K. G. *Conversations with Eternity: Ancient Man's Attempts to Know the Future*, Rider, London, 1984.
  - 37 Ibid., pp. 32-7.
  - 38 Quincey, J. H. 'The Beacon-Sites in the *Agamemnon*', *The Journals of Hellenic Studies*, London, Vol. LXXXIII, 1963, pp. 118-32.
  - 39 Hume, David, *The History of England*, Porter and Coates, Philadelphia (undated nineteenth century), 3 vols. p. 37, Vol. 4 (end of Chapter 62. See also John Aubrey, *Brief Lives* (entry for William Harvey, Hume got much of this from Aubrey (Hume is not always to be trusted, he does misrepresent General Monk's motives shamelessly despite Aubrey's explicit account. Perhaps the reader uninterested in seventeenth-century English history will forgive this aside.)
  - 40 See Note 35. The famous oracle of Ammon in Libya, visited by Alexander the Great following his conquest of Egypt (a fruit falling on one's head is a conquest), was at the Oasis of Siwa, where some ruins are still preserved. Also see maps in this book.
  - 41 Tompkins, op. cit., p. 181.
  - 42 Pritchard, op. cit. p. 44 ff (Scholar's references, including Jacobsen, on p. 45.)
  - 43 Kramer, S. N., *History Begins at Sumer* (originally entitled *From the Tablets of Sumer*, 1956, before revision), Doubleday Anchor Book (paperback), New York, 1959.
  - 44 See Garstang, John. *The Syrian Goddess*, translation by Professor Herbert A. Strong of the *De Dea Syria* of Lucian, ed. with notes and introduction by Garstang, London, 1913.
  - 45 See Note 43.
  - 46 Tompkins, op. cit., p. 336.
  - 47 Ibid. p. 349.
  - 48 Ibid. p. 346.
  - 49 See Note 27.
  - 50 Op. cit.

- 5 Graves, Robert, *The White Goddess, A Historical Grammar of Poetic Myth* Vintage paperback, New York, undated (originally copyright 1948 by Graves)
- 52 Ibid. See pages listed under *acacia* in index. (I leave this to the reader because my edition of this book is undated and will probably not match the reader's in pagination.)
- 53 Theophrastus, *Enquiry into Plants*, Book IV 1, 8. trans. by A. F. Hort. Loeb Classical Library, William Heinemann Ltd. London. and Harvard University Press, U.S.A. 2 vols. (This ref. vol. I p. 299) Theophrastus was the 'father of botany', and succeeded his friend Aristotle as Head of the Peripatetic School at the Lyceum in Athens. He lived 370-c. 285 B.C., and at the peak of his teaching career actually had 2,000 students.
- 54 Ibid., Book III, xiii. 7, vol. I, p. 249.

## SUMMARY

The other Arabian star named 'Weight' was in the constellation Argo. But we see the *Argo* was associated with Sirius, as was the first star named 'Weight' which was in the Great Dog constellation and a visible companion of Sirius.

If an *Argo* is projected on the globe with its helm near the ancient Egyptian city Canopus on the coast of the Mediterranean (the star Canopus forms the helm of the *Argo* in the sky) and with its prow at Dodona (from where the oak came which was placed in the *Argo*'s prow), if we hold the stern firmly on Canopus but swing the ship eastwards at the top, so that the prow points towards Mount Ararat, where Noah's ark was supposed to have landed, we find that the arc thus described is a right-angle of 90°.

Instead of Canopus we must really use the neighbouring site of the now entirely vanished city of Behdet, which was the capital of pre-dynastic Egypt prior to the foundation of Memphis.

Dodona is exactly 8° of latitude north of Behdet. Delphi is exactly 7° north of Behdet. Delos (another important early

oracle centre, vanished by classical Greek times) is exactly 6° north of Behdet. Behdet was the Greenwich of the ancient world prior to 3200 BC and was used as a geodetic headquarters.

Associated with near-by Mount Ararat as a mystery centre was the now little-known site of Metsamor. Mt Ararat is 8° north of Bender and on the same parallel as Dodona.

A site on Kythera is known to have connections with early dynastic Egypt as a religious centre and is about 5° north of Behdet. The island of Thera may, however, have been an oracle centre. It was destroyed by a famous volcanic eruption in Minoan times.

All these sites were revealed as a pattern now termed a 'geodetic octave' by the projection on the globe of the *Argo*, which is connected with Sirius. Sirius was not only the element of the most sacred traditions of the Dogon and the ancient Egyptians, but apparently of the entire civilized and cosmopolitan Mediterranean world prior at least to 3000 BC and probably well before 3200 BC.

The amphibious creature Oannes, who brought civilization to the Sumerians, is sometimes equated with the god Enki (Ea) who ruled the star Canopus of the *Argo*. Enki is a god who sleeps at the bottom of a watery abyss, reminiscent of Oannes who retired to the sea at night. Enki is also the god responsible for the ark in those early tales of the Sumerians and Babylonians from which the Biblical ark and deluge story was derived.

The 'Greek ark' was claimed to have landed at both Dodona and Delphi. An 'ark' was carried in procession at Delphi.

At Delphi and at Delos are surviving omphalos ('navel') stones. Omphalos near Knossos in Crete is 4° north of Behdet. We know from the Homeric *Hymn to Apollo* that Minoans (before 1200 BC) 'from Knossos took Apollo to Delphi'.



## THE ORACLE CENTRES

The Egyptian Pharaoh Akhenaten's reform was really at least partially a geodetic one, explaining the move of his capital city. He may have wished to return to the 'pure' system of pre-dynastic times.

Herodotus tells us that Dodona (according to its priestesses, whom he knew) was founded from Egypt specifically Egyptian Thebes. Thebes is equidistant from both Dodona, where the Greek ark landed, and Mount Ararat, where the Hebrew ark landed. The three points, when joined, form an equilateral triangle on the globe. Also according to Herodotus, the Oasis of Siwa, with its oracle of Ammon, was founded from Thebes. This oasis centre and Thebes are both equidistant from Behdet. Geodetic surveys of immense accuracy were thus practised in ancient Egypt with a knowledge of the Earth as a spherical body in space and projections upon it envisaged as part of the institutions embodying Sirius lore for posterity.

## SUPPLEMENT (1997)

There is no aspect of the Sirius mystery which I have a greater interest in researching further than the geodetic aspect, including the Oracle Octaves. I did push this subject forward some more by writing a section on oracle centres in my book *Conversations with Eternity*, which appeared in 1984. A few further aspects concerning it were addressed also in the notes to my translation of the *Epic of Gilgamesh*.<sup>2</sup> But most of my further work has not been published and is incomplete, owing to the lack of funding for expeditions to farflung places. For instance, I now believe that I know the true original location of the first Oracle of Dodona, which is some distance further up the mountain than the classical site (just as the original site of Delphi is two miles higher up than the place visited by tourists). But to inspect it would require

more than just a casual visit, and should involve at least a small team.

In 1979, my friend Randy Fitzgerald and I set up an American foundation to solicit funds for, among other things, a proper investigation of ancient geodetics. But we were not successful and the foundation closed down. At that time some highly qualified experts were prepared to help us, but we could not even cover their expenses. From time to time eccentric multi-millionaires have wasted my time toying with the notion of paying for some Sirius mystery research, but they have always turned out to be hopeless characters. Most of them have been egomaniacs. One in particular wasn't, but he was as useless in the end as the rest. There is something about very rich people that makes them a complete waste of time, like over-endowed birds of paradise who show their colourful feathers only in some remote forest where only the monkeys can see them. And the strangest thing of all is that every time I have ever had any dealings with a very rich person, I have always ended up poorer. They have some way of sucking money out of your pocket by a vacuum mechanism, and the money never gets replaced. They start by offering some advantages, perhaps a free fare to see them, or something of that kind. But this always turns into the need to spend money on them, instead of the other way around.

So, I'm afraid that most of my further work on these matters remains in an incomplete state owing to the inability to carry out the appropriate investigations. You simply cannot study geodetics without making extensive travels, and these need to be with the right people, such as a surveyor for instance. It would be pointless to apply to a foundation for support, because all such bodies would throw their hands up in horror like outraged virgins about to be raped, owing to the connection with that unrespectable subject, extraterrestrials, the very mention of which is meant to condemn all scholarly work as absurd and the author to be branded insane. (Severa,

of my stuffer friends dropped me completely after the publication of *The Sirius Mystery* because discussions of extraterrestrial life are not socially acceptable and I was clearly a dangerous madman.)

There is one crucial addition to this subject which I propose to make here, however, although to investigate it fully the amount of necessary travelling would instantly double that needed to get to grips with these issues. It concerns China, and by considering it we can really 'get a handle on' the Mediterranean Oracle Octaves.

When I wrote *The Sirius Mystery*, I had not yet commenced my long and fascinating association with Joseph Needham, and hence I was entirely unaware of what I am about to discuss. Indeed, only a tiny handful of people in the West – or even in China, for that matter – will ever have heard of the subject I am about to raise.

About 1982, I first met Joseph Needham of Cambridge, although I had first read some of his writings in 1963 and knew very well who he was from that time. He has died now, but he was perhaps the greatest scholar in any field since Edward Gibbon, author of *The Decline and Fall of the Roman Empire*. Joseph's mammoth work *Science and Civilisation in China* has reached nearly twenty volumes by now, and unpublished portions are still being readied for publication by a huge team of collaborators. My association with Joseph was rather different from those of the official 'collaborators'. They tended to be academics, often in remote universities in a variety of countries, and fulltime Sinologists. I had a more free-wheeling relationship with Joseph and his Chinese collaborator Lu Gwei Djen, who was eventually to become his second wife. In fact, I had a closer friendship with Gwei Djen than I did with Joseph, because Joseph was a more distant type of person, whereas Gwei Djen and I shared a mischievous sense of fun and were always laughing together. She was truly wonderful. We had such fun when we all

travelled to China together in 1986. She died before Joseph did, having lived for two decades with only half of one lung, so that she was always short of breath in a wheezing sort of way, and her laughter as a result was always semi-breathless.

She loved to tease people whom she thought were being stupid or self-important, and this made my life more difficult because she often teased and taunted some of her more pompous colleagues about not being able to keep up with Robert Temple, which of course made them hate me. Worst of all was the late Colin Ronan, who as he was in charge of all the photos and illustrations stored at the Needham Research Institute, spitefully refused me access to them when I was compiling an illustrated book with Joseph! And when my own photos were published by Joseph, Colin would erase my photo credit. That is how petty and pathetic he was. Fortunately, I had the help of the young librarian at that time, Carmen Lee, who sneaked the photos and illustrations to me after Colin had gone home in the evenings, and immensely enjoyed scheming to get round his roadblocks to my work. Gwei Djen's reaction to all this was simply to taunt and abuse Ronan all the more, having contempt for how low he could stoop at pettiness, thus increasing his determination to thwart me at all costs. Sometimes one's friends really know how to make things worse for one! Even though it was all so unpleasant, it had the advantage of being hilariously funny as well, because Ronan's efforts to block my work were really a kind of Marx Brothers farce. Rather like watching a beetle rolling a dung ball uphill, I never ceased to be amazed at the phenomenal energy that Ronan put into his entirely negative project - which consumed a large proportion of his waking hours. It is truly amazing how people can become obsessed with enmity to the exclusion of productive work.

Even when I am the victim of these campaigns, which I have so often been, I still cannot help laughing at the ridiculousness of the people engaged in such a waste of their

time. However, it has taught me that there is a widespread perversity in human nature whereby it is not uncommon for someone to dedicate himself not to constructive activity, but only to destructive activity. For those of us who are builders rather than destroyers, this demented mentality will always remain incomprehensible, but we ignore it at our peril. The root of the problem is personal vanity: if *I* can't do it, nobody else will! Or: I may be inferior, but I'll see to it that I level anything higher, so that I am not shown up so badly. *Vanity*, pure *vanity*, is at the basis of much that is wrong with the world. And those of us who can laugh are the ones who have managed to free ourselves to greater or lesser extent from this suffocating human failure. Gwei-Djen, for instance, was as lacking in vanity as a mountain spring is lacking in sea salt. And the same was true of Joseph, whose laughter may have been quieter, but he would rock with it like a giant toppling boulder about to fall down the hillside, and one sometimes feared for his chair. Gwei-Djen would dig him in the ribs with her fingers and provoke him to even greater mirth, and his face would crack like a chestnut. 'Isn't it, Joseph? Isn't it?' He would turn his eyes fondly on her and agree that indeed it was, indeed it was, beaming with love and laughter as she mocked the follies of the people they knew mercilessly and he, who would not normally have taken the time out from his work to do so, vicariously enjoyed this mischievous digression. But enough of Joseph and Gwei-Djen. I just wanted to paint the picture of what it was I was doing.

My task was to write the popular book about the history of Chinese inventions and discoveries which Joseph had announced as early as 1946 he intended to write, but which he never had time to do. Gwei-Djen was the greatest advocate of getting me to do this, pointing out to Joseph, who accepted it that he was well up in his eighties and simply would never do it himself. And thus it was that I set about reading

everything Joseph had ever written (except for his earlier work in embryology), including his unpublished manuscript material. I know I must have read at least eight and a half million words of Joseph's. There was no time to take notes, so I just remembered it all, which was so much simpler. But it meant I had to remember 'tracking data' as well, since I had to be able to open to the right page of the right volume to piece together the fragments for every subject that came up, as Joseph's organizational principle was wholly incompatible with mine. (It was like going between two different computer languages, I suppose.) The result was my book, originally entitled in Britain *China: Land of Discovery and Invention* and in America *The Genius of China*. The book was later reissued in Britain under the title *The Genius of China*.<sup>3</sup>

In the course of going through all Joseph's material, I came across one of Joseph's most obscure articles, published in 1964. Entitled 'An 8th-Century Meridian Line: I Hsing's Chain of Gnomons and the Pre-History of the Metric System', it was written jointly with Gwei-Djen, another Sinologist, and three astronomers.<sup>4</sup> I had some discussion with Joseph about this amazing subject and he agreed that if we (but by then 'we' could not include him, as he was too old for such travel) could visit the sites and do a proper study on the ground of the geodetic phenomena, it would be an incredible project which would yield a great deal of fascinating findings. Joseph had wanted to do this since the 1960s but never had the opportunity, because of course the ten years' madness of the Cultural Revolution got in the way at that time, and travel in the Chinese countryside was absolutely impossible even for him, despite being a friend of Chou En Lai. After Joseph discovered the Meridian Line it was to be nearly twenty years before a geographical investigation of it could be even remotely possible, and by that time Joseph was getting too old for such an exhausting project.

The great eighth-century mathematician and astronomer I Hsing is one of my and Joseph's favourites in the history of Chinese science. But I shall transform the spelling of his name into the modern Pinyin system, and call him Yixing here. (In my book on Chinese science I preserved the old spellings of the Wade-Giles system, because they match Joseph's own volumes and most scholarly publications.) In quoting from the article by Joseph, Gwei Djen, and their co-authors, I shall change all Chinese names into Pinyin below. I shall also alter Joseph's quirky use of dates, since he refused to use AD and BC but insisted upon plus and minus signs instead, which only serves to confuse people!

Here, then, are some excerpts from the article, and practically all the explanatory remarks made about the purposes and uses of the system could apply equally well to the Mediterranean Oracle Octaves.

The fundamental significance of the introduction of the metric system lies in the fact that it was the first great attempt to define terrestrial units in terms of an unvarying cosmical quantity. This system took its origin in the need imposed by the development of scientific thought for immutable and at the same time conveniently related units of physical measure. And they imply that this need was not satisfied until the last decade of the eighteenth century AD. This may be true enough for Europe but . . . an approach was made to such an immutable unit in China in the first decade of that century. Moreover, as in the case of many post-Renaissance developments, there were earlier historical aspects of this celestial-terrestrial bond, indeed we can find already in the eighth century AD in China a large-scale attempt to establish it.

A great step forward was taken when the idea arose of fixing terrestrial length-measures in terms of

astronomical units. That this could have occurred to the scholars at all was due to the fact that the Sun's shadow thrown by an 8-foot gnomon at Summer Solstice had a very convenient length (about 1.5 feet) at the latitude of Yang-cheng, the 'centre of the Central Land' [The Chinese name for China means 'Central Kingdom'] From ancient times use had been made of the 'gnomon shadow template' (*tu gwa*), a standard rule made of pottery, terracotta, or jade, equivalent in length to the solstitial shadow. This was used for the determination of the exact date of the solstice each year.

It was a long-standing idea that the shadow length increased one inch for every thousand *li* [a *li* was a common measure of distance in China, like the mile or kilometre to us, but unfortunately it varied at different times in Chinese history, which causes historians of science lots of headaches] to the North of the 'Earth's centre' at Yang-cheng, and decreased in the same proportion as one went to the South. After the end of the Han period (third century AD), measurements made as far south as Indo-China soon disproved this numerically, but it was not until the Tang Dynasty (eighth century AD) that a systematic effort was made to cover a great range of latitudes.

This effort aimed at correlating the lengths of terrestrial and celestial measures by finding the number of *li* which corresponded to 1° change in the altitude of the Pole Star (giving the geographic latitude of the observer's position) and thus, in effect, fixing the length of the *li* precisely in terms of the Earth's circumference. The meridian line set up for this purpose takes its place in history between the meridian line of Eratosthenes (circa 200 BC) and those of the astronomers of the Caliph al Ma'mun (circa 827 AD). Its detailed examination is the subject of this paper.<sup>5</sup>



Here we can already sense the importance of the Chinese project, and its relation to our earlier Oracle Octaves, of which by the way Joseph knew nothing whatever. For anyone encountering the Oracle Octaves must immediately wonder 'Why?' Why go to all those distant mountains tops and remote regions, why mark out such a lengthy series of latitude lines, why go to such incredible trouble—what was it all for?

When we look at the matter from the point of view given by Joseph about the Chinese project of the eighth century, we suddenly realize that perhaps the determination of the number of 'miles' (or whatever land measure you like) in a degree of latitude, an exact measure of the Earth's circumference, and a precise correlation of 'the lengths of terrestrial and celestial measures', to use Joseph's words, was considered worth it. But there was a great deal more involved, as we shall see

When Liu Chuo, in the early part of the seventh century AD, realized the fallacy of the statement that a change by 1 inch in the length of the Sun's shadow corresponded to a change of 1,000 *h* in distance, he wrote to the Emperor as follows.

'We beg Your Majesty to appoint water-mechanics and mathematicians to select a piece of flat country in Henan or Hebei, which can be measured over a few hundred *h* to choose a true North-South line, to determine the time with water-clocks, to [set up gnomons] on flat places [and using them with] plumb-lines, to follow seasons, solstices and equinoxes, and to measure the shadow of the Sun [at different places] on the same day. From the differences in these shadow-lengths the distance in *h* can be known. Thus the Heavens and the Earth will not be able to conceal their form and the celestial bodies will not prevent us from knowing their measurements.'

His advice was not adopted by the Sun Emperor.<sup>6</sup>

Although this was the first suggestion of a national network of which a textual record fully survives, the issue goes back many centuries earlier in China. Needham and Lu translated a relevant section from the *Record of Institutions of the Zhou Dynasty* (*Zhou Li*) which was compiled no later than the second century BC, but contains material from the Zhou period several centuries earlier than that. It speaks of

the method of the gnomon shadow template to measure 'the depth of the Earth' and to establish correctly the sun shadows in order to find the centre of the Earth.

The place where the shadow at [Summer] Solstice is 1 ft 5 in. is called the centre of the Earth. This is where Heaven and Earth unite, where the four seasons intermingle, wind and rain join together, where the Yin and the Yang combine. Then all things prosper and the royal territory may be established there.<sup>7</sup>

By the second century AD, Zheng Xuan stated that the Sun shadow differed by one [Chinese] inch for every 1,000 *li* on the Earth's surface [going north or south]. 'From the place where the shadow is 1 ft 5 in. it would be [he thought] 15,000 *li* to the South to the place directly below the Sun [i.e., at the Equator]. The Earth makes its four excursions and the stars rise and fall within a range of 30,000 *li* so by taking the half of this one gets the centre of the Earth'.<sup>8</sup>

We are now beginning to see what was needed: samples of solar shadow lengths taken over a huge stretch of territory to the north and to the south, along a series of ascending and descending latitude lines. This is precisely what must have been involved with the Oracle Octaves. The oracle centres of the Mediterranean were also places 'where Heaven and Earth unite', as the second-century BC Chinese document so beautifully expressed it. The Mediterranean region's 'navels of the Earth' were intended precisely as that.

When the French excavators excavated the older of the Delphic omphalos stones, they found the name Gaia ('Earth') written on it together with the symbol 'E' (see Appendix V). But they also discovered that this ancient omphalos stone had a hole in the top as if a thin metal post had protruded from it at one time. I would suggest that it either represented or actually functioned as a gnomon, which is a thin upright to cast a shadow to be measured (This is the origin of the Egyptian obelisks—gnomons to cast measurable shadows.) This is all a bit like very sophisticated sun-dials, but instead of measuring the time of day, far greater considerations were at stake, such as the circumference of the Earth.

How far did the Chinese take this, then? The full system was finally organised between the years 721 and 725 AD under what was by then the Tang Dynasty. As Needham and Lu and their colleagues say

the required expeditions were organised under the direction of the Astronomer Royal, Nangong Yueh, and a Buddhist monk, Yixing, one of the most outstanding mathematicians and astronomers of his age. Our sources of information about them are quite extensive. The sources tell us that at least eleven stations were established where simultaneous measurements of shadow lengths were made using identical 8-foot gnomons. The latitude of these stations ranged from  $17^{\circ}4'$  (at Lin-Yi [near Hue in present-day Vietnam]) up to  $40^{\circ}$  (at Wei-zhou, an old city near modern Ling-chiu, near the Great Wall in northern Shanxi, and almost at the same latitude as Peking). And there was even another place still farther North, the country of T'ieh-lo (Tö.ös) horde of Turkic nomads near Lake Baikal. Yang-cheng was a place which had been for centuries the seat of the central imperial observatory of China. Although it did not belong to the measured central chain of stations, it is the only

place where one of the original gnomons of Yixing and Nangong Yueh is still preserved. On the South side this bears an inscription terming it 'Zhou Gong's Tower for the Measurement of Sun Shadows', and it is known to have been erected in 723 AD. The construction is such that at the Summer Solstice of that time the shadow just extended to the top of the pyramidal base, the slope of the North side of which corresponded exactly with the edge of the shadow. In later times, Guo Shou-jing, Astronomer Royal of the Yuan [Mongol] Dynasty, made shadow measurements at Yang-cheng with a gnomon of forty feet in height and a measuring-scale of some 120 feet. This was about 1270 AD, and there still remains intact at the place the massive tower and scale constructed in Ming times following his methods.<sup>9</sup>

Here are some more portions of the Tang Dynasty (eighth century) text.

If one went South from Yang-cheng along a road as straight as a bowstring to the point directly below the Sun [the Equator] it would not be as much as 5,000 *li*. The Commissioners for Shadow Measurements, Daxiang and Yuan Tai, say that at Jiao-zhou if one observes the pole it is elevated above the Earth's surface only a little more than 20°. Looking South in the eighth month from out at sea Canopus is remarkably high in the sky. The stars in the heavens below it are very brilliant and there are many large and bright ones which are not recorded on the charts and the names of which are not known. . . [on the other hand] there are the Gulgan people who live to the North of the Uighurs, dwelling North of Han-hai [Lake Baikal] where grass is plentiful and there are many herbs, and where fine horses are produced capable of going several hundred *li* [in a day]. To the North of that there is still some distance to

the Great Sea [the Arctic]. The days are long and the nights are short. After the Sun has set the sky is still half lit and if you cook a sheep the outside is hardly done before the dawn begins to appear in the East. . . In the 13th year of Kaiyuan reign period [725 AD] Nangong Yieh the Astronomer Royal selected a region of level ground in Henan and using water-levels and plumb-lines set up 8-foot gnomons with which he made measurements. Beginning at Bao-ma Xien in Hua-zhou he found the Summer Solstice shadow to be 1 foot 5 7 inches. Proceeding South from the observation station at Hua-zhou 198 *li* 179 *bu* [a fraction of a *li*] they reached the old observation station at Jün-Y. Bien-zhou with its gnomon there the Summer Solstice shadow was found to be 1 foot 5 312 inches. Again, going South from Jün-Y. for 167 *li* 281 *bu* they reached the gnomon at Fukou Xien in Xu-zhou, which gave a length of 1 foot 4 4 inches at the Summer Solstice. Then 160 *li* 110 *bu* South of Fukou there was another gnomon at Wupin near Shangtau in the district of Yazhou, which gave a shadow of 1 foot 3 65 inches at Summer Solstice. In all, therefore, in a distance of 526 *li* 270 *bu*, the difference in shadow length was a little more than 2 inches. This completely disagreed with the opinion of the ancient scholars that for a distance of 1,000 *li* in the royal territory there would be a variation of 1 inch in the shadow's length.

The passage goes on and on like this at enormous length and then concludes

Thus the differences in the Sun Shadows vary as between the Winter and Summer Solstices and also as between northern and southern latitudes. But the ancient scholars equalized the differences everywhere with a fixed value in terms of *li*, and so failed to give a true account. Accordingly the monk Yixing prepared the 'Da Yen'

diagram and also the 'inverted square diagram' covering the range from the furthest South to the furthest North. He also made twenty four diagrams in order to investigate the computations of the eclipses of the Sun, and to establish the lengths of the indicator rods of the night clepsydra [water-clock]. Here we record the shadow lengths in feet and inches of all the observation centres. [skipping all of this] On the basis of the northern and southern Sun shadows, Yixing made comparisons and estimates. He used the 'right angle triangle' method to calculate them. Roughly speaking, the distance between the North and South poles was found to be scarcely more than 800,000 ft.<sup>10</sup>

That is enough about the details of the visits to the stations, the measurements, etc. I gave that much in order for the reader to get a feel for the kind of mentality at work with early scientists visiting a long string of measuring-stations. These expeditions of working-parties of scientists are similar to what can be imagined visiting the Mediterranean centres. But let us see some of Needham and Lu's conclusions.

The accuracy achieved is uncanny. It can easily be seen that the computed shadow lengths which are quoted to 3 significant figures are indeed accurate. . . to 0.1 inch or nearly 1 part in a thousand. . . . To enable divisions of this smallness, i.e. of about 2 minutes of arc, to be read off with any certainty they would have to be separated by, say, 1 cm. This magnification would have required a circle of radius exceeding 17 metres, or a room at least the size of a large palace hall. . . . While the length of the central series of stations was some 150-215 kilometres, that of the whole series was as much as 2,500 kilometres, and if the most northerly place is included, a line of no less than 3,800 kilometres was considered. This work

## THE ORACLE CENTRES

must therefore surely be regarded as the most remarkable piece of organised field research carried out anywhere in the early Middle Ages. Even if the ground distances of the furthest stations were not measured, there can be no doubt that observations of Sun shadow lengths were systematically made at them.<sup>1</sup>

We now begin to see what a gigantic enterprise this was, and that it rivalled in extent the Oracle Octaves of the Mediterranean. 3 800 kilometres is a huge distance over which to string a series of observational stations at successive latitudes. This amazing eighth century project therefore serves as a significant example to us of what the construction and use of the Oracle Octaves must have been like. Imagine all the Chinese records of the project which we have just described being lost – there is just the Yang cheng gnomon and a few scraps of evidence at other sites of the observation stations (whereas in fact we know that there is none). All the texts have been destroyed. How would we ever have known about this incredible project strung out over 3,800 kilometres? And if someone had come along like myself and claimed that there had been such a project, no one would have believed him. Because it seems too incredible to be true. And yet we know that it is because we have the texts to prove it, even though they only came to light as recently as 1964. This is similar to the situation with the Oracle Octaves. I have gathered huge amounts of circumstantial evidence, so massive that it is enough to convict for murder. But we do not possess the official reports such as the Chinese ones which survive. However, this Chinese example gives us heart. It shows us that such huge projects were indeed mounted by early empires, and what the motivations were. I omit here all the further details such as the availability or otherwise of trigonometric tables, of the use of 'shadow-catcher' devices to refine the edges of blurred Sun-shadows because the Sun is

not a point-source of light but a disc (which in any case I shall explain in my next book, which touches on such matters), and so forth. There is no need here for any further detail.

Needham and Lu also came to the edge of their available evidence. 'Did Yixing attempt to derive from his measurements a value for the circumference of a spherical Earth? It is impossible to say. Although no record remains in the texts that Yixing made any calculations to obtain from his data the dimensions of a spherical Earth, certain Chinese cosmological schools had from antiquity onwards assumed its sphericity. This would have been very well known to him. Moreover, his acquaintance with Indian and Hellenistic astronomy, gained as an outstanding Buddhist scholar, may well have informed him of the previous estimates of the Earth's circumference. There is thus no reason why Yixing should have hesitated to use in this way the data which his observers collected. Besides, it is hard to see how he could have given a constant *li* per degree, if he had not had at least some previous notion of a curved Earth's surface'.<sup>2</sup>

And thus we leave China. At the time I originally wrote *The Sirius Mystery*, I had no idea whatever of the Yixing project in eighth-century China. And another major source of information was also unavailable then – the English translation of Claudius Ptolemy's *Geography* (written in the first century AD). The only translation had been published in New York in 1932, but in an edition limited to 250 copies. However, in 1991 Dover Publications brought out a magnificent large-format paperback of it at a very modest price, so that now it is available to everyone.<sup>13</sup> It is a strange and unsatisfactory book. Ptolemy was a querulous, whingeing sort of character. He starts out hypocritically paying lip service to the achievements of his predecessor Marinus, but soon commences tearing him to shreds and scoring points off him. Most of the actual text of the book is devoted to this



sustained attack on Marinus, who was guilty of every fault, and the posturing of Ptolemy who wishes us to believe he is the first sensible geographer who has ever lived. The rest of the book is largely just page after page of data. It seems that Ptolemy was indeed more scientific and rigorous than Marinus in many ways, and did bring about some scientific improvements. On the other hand, I thought that there were some occasions when Marinus was right and Ptolemy was clearly wrong. But since we do not possess Marinus's work, we can never carry out a true comparison.

There are several points in Ptolemy's work which are very interesting from the point of view of the Oracle Octaves. I have suggested that the latitude line of Rhodes, which cut through the destroyed Minoan island of Thera, was an oracle centre line. I couldn't help but note that Ptolemy many times speaks of the latitude of Rhodes. He leaves us in absolutely no doubt that this parallel was one of the fundamental parallels in ancient geography. For instance, in Book I, he mentions the parallel many times and says:

The parallel passing through Rhodes must be inserted because on this parallel many proofs of distances have been registered and inserted in right relation to the circumference of the greatest circle, following in this Marinus who followed Epitetratus. By thus doing we shall insure that the longitude of our earth, which is the better known, will be in right proportion to the latitude. We will now show how this may be done, treating first, as far as is necessary, of the properties of a sphere.<sup>14</sup>

And on another occasion

Only the parallel through Rhodes has [Marinus] kept in right proportion to its meridian and the circumference of the equatorial circle.<sup>15</sup>

Many of Ptolemy's latitudes and longitudes are numerically incorrect, as might be expected. But the fact that we see 'the parallel of Rhodes' used centrally in this way, with at least two named predecessors who laid emphasis upon it, gives some comfort to us in believing that the Oracle Octave scheme was indeed meant to be used as a system of latitudinal reference for just such purposes. The kind of uses referred to by Ptolemy are similar to the preoccupations of Yixing.

The amount of data marshalled for Ptolemy's book is absolutely gigantic, and is obviously drawn from centuries of reports by travellers—hundreds of them. There must have been, for a very long time before Ptolemy, vast repositories of (often conflicting) geographical data. He seems to have shovelled it into his book by the spadeful with very little commentary. It is not the exactness of the data nor even its organization which is of particular interest, but its sheer bulk. Ptolemy was clearly drawing upon information in a raw form and many other attempts to organise it by a long series of predecessors. He also had to hand a huge quantity of maps, portulans (coastal port maps from sea captains), and cartographic aids. But what strikes me is that this vast mass of data, which had been garnered over so long a time, was preserved without any accompanying or informing structure. It is as if one had come upon a huge pile of lamb chops and from them tried to imagine what a lamb might have looked like.

I believe that the huge body of data indicates a long and continuing accumulation of geographical information which had gone adrift and lost its anchorage. In a much, much earlier time, this type of information had been harnessed to a system of surpassing ingenuity—brilliant schemes such as the Oracle Octaves had given shape to every particular. But that system had been lost entirely. From the flotsam and jetsam that survived, combined with the late reports of travellers (including much which resulted from Alexander's conquest

## THE ORACLE CENTRES

of the known world, of course), latecomers such as Marinus and Ptolemy struggled to construct something using only their geometrical notions and such ingenuity as they could muster. But it is clear that by their time, the tradition was gone, and they were wading knee-deep in place names, whilst upon the waves floated latitude and longitude numbers bobbing like corks. They tried with greater or lesser success to estimate distances from numbers of days travelled, and so forth (Ptolemy was always subtracting from these, very sensibly stressing that crossing deserts was not easy, etc.), but they were not operating within a grand scheme anymore. They were improvising. They were actors without a script, possessing only a few throwaway lines and plenty of costumes. It pays to read Ptolemy if only to see what a fellow could do with masses of data and no organising principles other than a few geometrical insights and a heady dose of scepticism. Not bad. But not particularly good either.

I offer these further reflections in the hope that they will be helpful. If fortune wills, time will bring more upon its returning tide.

## Notes

- Temple, Robert K. G. *Conversations with Eternity*. Rider, London, 1984. This book was only published in English in the British Commonwealth and in Polish; part of it was published in German. No American edition ever appeared, and very rude things were said to me about the supposed incapacity of the American public to take an interest in or have the intelligence to understand such matters, with which I could never agree. By in the 1980s it is perhaps true that people everywhere were obsessed with economics and the struggle to survive in the face of a very serious worldwide economic depression. That decade also coincided with the final collapse of the traditional Western value system.
- 2 Temple, Robert K. G., *He Who Saw Everything: A Free Translation of the Epic of Garganes*. Rider, London, 1991. This book was never published outside the British Commonwealth.

## THE SIRIUS MYSTERY

- 3 Published in 1986 in English, and in a large number of foreign languages subsequently. A wonderful Chinese edition was prepared by the Chinese Academy of Sciences using a team of thirty-four specialist translators.
- 4 Beer, A., Ho Ping-yu, Lu Gwei-Djen, Needham, J., Pu icyblank, L. G., and Thompson, G. I. 'An 8th-Century Meridian Line: I-Hsing's Chronology of Anomalous and the Pre-history of the Metric System' *Studies in Astronomy*, Pergamon Press, Oxford, etc., Vol. 4, 1964, pp. 3-28.
- 5 Ibid. pp. 3-4.
- 6 Ibid., p. 4.
- 7 Ibid. p. 9.
- 8 Ibid.
- 9 Ibid. pp. 8-9.
- 10 Ibid., pp. 10-13.  
Ibid., pp. 8-19 and 14.
- 11 Ibid., p. 25.
- 12 Ptolemy Claudius *The Geography*, translated and edited by Edward Luther Stevenson, Dover New York, 1991.
- 13 Ibid., p. 40.
- 14 Ibid., p. 39.

## CHAPTER SEVEN

# Origins of the Dogon

We shall now return to Hercules and the number fifty. A connection between them arises in Pausanias, Book IX (27-5), when Pausanias is discussing a city in Boeotia, which is the region where Orchomenos is. The city is called Thespiæ 'below Mount Helikon', as he says. He continues:

They have a sanctuary of Herakles [Hercules] where a virgin priestess serves until she dies. They say this is because Herakles slept with all the fifty daughters of Thestios\* in the same night, except for one. She alone refused to mate with him. Thinking she was insulting him he sentenced her to be his virgin priestess all her life. I have also heard another legend about it: that Herakles went through all Thestios's virgin daughters on the same night and they all bore him male children, but the youngest and the eldest bore him twins. But I am quite unable to believe that other story, that Herakles could behave so arrogantly to the daughter of a friend. Besides, even when he was on earth he used to punish arrogant outrages, particularly if they were against religion: so he would hardly have founded his own temple and set it up with a priestess like a god. But in fact this

\* A mythical figure.

sanctuary seemed to me older than the days of Herakles son of Amphitryon, and to belong to the Idaian Daktylos called Herakles, whose sanctuaries I also discovered at Erythrai in Ionia and at Tyre. Actually even the Boiotians\* knew the name, since they say themselves that the sanctuary of Mykalessian Demeter has Idaian Herakles as patron.

Levi adds in a footnote that the sanctuary at Tyre is mentioned by Herodotus (2, 45), and gives other references as well.<sup>1</sup>

To return to the amorous labour of Hercules. I hope it will be noted that Pausanias had here elucidated a Middle-Eastern connection for this tale with the important city of Tyre, the site of which is off the coast of present-day Lebanon. Here, at least, we have a bit of evidence from ancient times bearing direct witness to the connections between these endless curious traditions in Greece about the fifty and their Middle-Eastern counterparts, or at least Middle-Eastern locale.

It would now be worth while for us to see what Robert Graves has to say about this tale. Graves calls Thespios by the name of Thespius and spends some time pondering the meaning.<sup>2</sup> He says it means 'divinely sounding', but wishes he could find another meaning. I am inclined to be happy with 'divinely sounding', because of what I believe to be the heavy emphasis on music, sound and harmony among the ancients. The Greeks were reputed, for instance, to have considered music the highest art, and the Pythagoreans made harmony and number into an actual religion. We have already come across the use of the octave as a relevant theme in our considerations and we have seen the possible connection of *amphaios* and *om* – the latter being the Indo-Aryan sacred syllable chanted for its 'divinely sounding' qualities and surviving in Christianity and Islam as 'Amen'. Since if we were to look for a Greek word to describe the sacred syllable *om* we

\* Boeotians

could choose the appropriate name meaning 'divinely sounding', it seems that this meaning is by no means unsatisfactory. Graves tells us the following<sup>3</sup>

King Thespius had fifty daughters by his wife Megamede [mega *Medea?*] daughter of Arneus, as gay as any in Thespiæ. Fearing that they might make unsuitable matches, he determined that every one of them should have a child by Heracles\* [Hercules], who was now engaged all day in hunting the lion, for Heracles lodged at Thespiæ for fifty nights running. [Notice fifty applied here as a succession of *days*: days, months, years. They can become blurred as long as *fifty* remains.] 'You may have my eldest daughter Procris as your bedfellow.' Thespius told him hospitably. But each night another of his daughters visited Heracles, until he had lain with every one. Some say, however, that he enjoyed them all in a single night.

It is interesting to note that the name Procris of the eldest daughter means 'chosen first' *Prokrossai*, which is a closely related form of the same stem means 'ranged at regular intervals like steps'. Now, what could be a more obvious name for the eldest daughter than one with such overtones and signification if it were clearly intended, as it obviously was, to emphasize that the daughters were not meant to be thought of as individuals but as successive expressions of fifty successive periods of time — in this case, twenty-four hour periods, or days? But the intention obviously was to highlight the sequence of fifty time periods, personified as 'daughters' enjoyed by our ubiquitous Hercules who is connected in so many ways with the Sirius complex.

Graves adds<sup>4</sup> 'Thespius's fifty daughters — like the fifty

\* Some authors and translators have used Herakles, others Heracles.

Danaids, Pallantides, and Nereids, or the fifty maidens with whom the Celtic god Bran (Phoroneus) lay in a single night must have been a college of priestesses serving the Moon-goddess, to whom the lion-pelted sacred king had access once a year during their erotic orgies around the stone phallus called Eros ('erotic desire'). Their number corresponded with the lunations which fell between one Olympic Festival and the next.\*

Here is Graves's irrepressible moon goddess—and here are her lunations! She carries them about with her wherever she goes. But unfortunately, Graves's brave attempt to find a lunar rationale for the fifty is not sufficient. The Olympic Games were, as they are now, held every four years, and the Olympiads or four year periods were understood to have commenced in 776 B.C., which is an extremely recent date compared with the extreme antiquity of the fifty in all its myriad occurrences. For instance, there were no Olympiads in Homer's day when 'the tale of the *Argo* was on everybody's lips', and the fifty Minyæ were on their way into literary immortality in what was to become the Western world. Much more likely that a period of fifty lunations was modeled after a long-established tradition—the esoteric fifty year period. Thus the fifty month and fifty-day sequences were probably derived in emulation.

I assume that the cycle of fifty lunations which Graves mentions here is identical to his fifty-month period of the reign of a sacred king, which is supposed to be 'half of a Great Year of a hundred months'. Can it be that fifty as half of one hundred, is meant to represent by its reduplication the two-to-one ratio as a means of signifying the concept of the musical octave with its two-to-one ratio?\*

\* The frequency of a note is doubled when it is raised an octave—hence a ratio of 2 to 1. This may be demonstrated visually on a single string and does not require the modern measurements of frequency.



And can this be why the *Argo* is supposed to be 'whole in the sky' (Aratos) and yet the constellation is also supposed to represent only the latter half of a ship? Can this apparent double-talk be yet another way of signifying the two-to-one ratio?

It also seems significant that each fifty month period is carefully specified to constitute 'one reign', even though it is only half of 'the Great Year'. Can 'one reign' be analogous to 'one orbit' and the 'Great Year' of two orbits be contrived to communicate the two-to-one harmonic ratio of the octave? Or does it refer to a shared fifty year orbit of two stars, Sirius B and Sirius C? Or *both* concepts at once?

Another occurrence of fifty and a hundred together is with the three monsters born to Uranus the sky and Gaia the earth. Their names were Cottus, Briareus, and Gyges. "From their shoulders sprang a hundred invincible arms and above these powerful limbs rose fifty heads attached to their backs." For this reason they were called the Hecatoncheires or the Centimanes,<sup>5</sup> as we are reliably told.

These monsters resemble the monster Cerberus, the hound of Hades who originally had fifty heads, but later became simplified and had only three heads—presumably for the same reason that these monsters are three in number, and also the reason that Hecate (whose pet Cerberus was, and who was a form of Isis-Sirius and whose name literally means 'one hundred') had three heads or forms, and that the boat of Sirius in ancient Egypt had three goddesses together in it. In other words, probably the same reason that the Dogon insist that there are three stars in the Sirius system (For some years the astronomical evidence went against the existence of a third star, with the conclusion that if there is a third star, it does not produce the perturbation which had been claimed for it before the seven years' observations by astronomer Irving Lindenblad.<sup>6</sup> However, the situation has now changed drastically with the apparent confirmation of the existence of Sirius C. See p. 3.)

We will recall that originally Hercules is supposed to have led the expedition of the *Argo*. In the version of Apollonius Rhodius he accompanies the expedition. In Graves we may read of another traditional exploit of Hercules in the Black Sea. He went 'in search of Hippolyte's girdle in the Black Sea' and 'the girdle belonged to a daughter of Briareus, 'strong'), one of the Hundred-handed Ones . . . , who was of course a fifty-headed one as well. And note his name Strong! The word *βριάρης* (*briaros*) means 'strong', and another form is *βριάρότης* (*briarotes*) which means 'strength, might', and a related form *βριθος* (*brithos*) means 'weight', and *βριθοσύνη* (*brithosyne*) means 'weight, heaviness'. Where have we encountered this idea before?

We should note that Hippolyte means simply 'letting horses loose'. And it was from Colchis that the horses of the sun were let loose every morning, for it was there that they were stabled, according to Greek tradition. There is also a really peculiar use of the word *hippopede*, which has the normal, mundane meaning of 'a horse fetter', in a cosmic sense. It appears from Liddel and Scott that this word was used by the astronomer Eudoxus (the one who went to Egypt and who was mentioned earlier) as the word for the curve described by a planet. We know this from Simplicius on Aristotle's *De Caelo* and Proclus on Euclid.\* Two sources are better than one. There is probably more to this than we can ever discover, for the necessary texts are lost.

If we examine the name Gyges, who was one of the other three monsters which included Briareus, we find its meaning has the same origins as *gigantelos*, which in English became 'gigantic', but the meaning of this word was not by any means simply 'giant'. Graves gives Gyges the meaning of 'earth-

\* Simplicius and Proclus are despised by the orthodox mentalists because they were *Neoplatonists*. See Appendix II B.



born, another concept we have come to expect in connection with our Sirius-complex of myths. Just as the stones Deukalion and his wife Pyrrha threw over their shoulders had been torn from their mother earth, Gaia, and were her bones turning into men to repopulate the earth after the flood and the voyage of the Greek ark, and just as Jason (and also Cadmus) sowed the teeth and they sprang up as 'earth-born men', so we find that Gyges is also 'earth-born'.

And just as Gilgamesh sought *strength* from the earth when 'his teeth shook' in the earth, so we discover that *gygas* means 'mighty' or 'strong' and is also used in Hesiod to refer to 'the sons of Gaia (Earth)', which is as specific as we could wish, for it gives an undeniable and conscious connection between 'the children of Gaia' of Deukalion 'the offspring of Gaia' of the Colchian teeth, and 'the sons of Gaia' who were a race of giants, and Gyges, whose mother was Gaia.

And we are not to forget that Gyges, like Briareus, can mean 'strength' and 'might', though with the particular shade of meaning added that it is strength and might drawn from the earth, which could be one way of describing a super-dense body of degenerate matter. After all, super-dense matter is 'strong earth'. We must also remember that Gyges has fifty heads.

As for the name Cottus, the third of the three monsters, Graves tells us that it is not Greek. Graves says (3, 1) 'Cottus was the eponymous [name-giving] ancestor of the Cottians who worshipped the orgiastic Cotytto, and spread her worship from Thrace throughout North western Europe. These tribes are described as "hundred-handed", perhaps because their priestesses were organized in colleges of fifty, like the Danaids and Nereids, perhaps because the men were organized in war-bands of one hundred, like the early Romans.'

The Cottians might possibly derive their name from an Egyptian word

Perhaps it was   *qetw*, which means

oarsmen' and has been applied to 'divine oarsmen' With a different determinative and when not applied to a man, the word means 'orbit', 'revolution' 'to go around' And the word in Egyptian was also applied to a group of specific people in a specific region 'The *Qetu* were the natives of Qen, which Wallis Budge says was 'The Circle' that is, 'the North Syrian coast about the Gulf of Issus and the deserts between the Euphrates and the Mediterranean'

There was also an Egyptian precedent for applying the same name to a god Qen is 'a god of the abyss', and a reduplicated version of the name which repeats the 't' as Cotytto does is Qetqet, who is significantly one of the thirty-six decans In addition, Qetsha refers specifically to 'the "nude" or Syrian goddess',\* which seems clearly to be an orgiastic element, for Graves says that Cotytto was an orgiastic goddess It seems fairly clear, then, that Cottus is of Egyptian origin and originally applies to the orbit of Sirius B and in the Egyptian era the particular term came to be associated with a people of Syria who moved to Thrace, and even in Egyptian times the name had all its applications to a foreign people, a foreign orgiastic goddess, and Sirius-related concepts including both oarsmen and an orbit, two ideas which I have frequently connected before Here in Egyptian we find an orbit called by a name which applies equally well to divine oarsmen And the word survives in the fifty-headed Cottus! Fifty oarsmen, fifty years in the orbit, fifty heads to the Sirius-monster How simple, how elegant

I am indebted to my friend the late Michael Scott who

\* The great goddess of Hierapolis (one of the oracle centres) must be intended by this 'Syrian goddess' See note 44 to Chapter Six, reference to Lucian's *De Dea Syria*, and Garstang, also see Bibliography

once rowed at Oxford, for the fine suggestion that there could hardly be a better analogy of any symbol with its intended meaning of 'a specific interval both of space and time' than the oar-stroke. Rowing is a precisely paced discipline when practised in earnest, as it was in ancient times when it was one of the two principal means of navigation at sea, and the only reliable one if the winds failed, as they so often did. It also represents a self-reliance which illustrates the self-impelled motion of a body in space which is orbiting (or what seems to be self-impelled)

I should point out here that the earliest name for the figure known to us as Hercules was, according to Robert Graves in *The Greek Myths* (132. h.), none other than Briareus. And we also have learned that the earliest form of Jason was Hercules (whose earliest form was Briareus). We thus find that Briareus, with his fifty heads, was the earliest captain of the fifty-oared *Argo*. Briareus, whose name means 'weight'. And whose brother's name means both 'oarsman' and 'orbit'.

Apart from the three monsters each with fifty heads, Gaia also gave birth to Garamas, who was not only earth-born, but who 'rose from the plain' like the earth-born men of Colchis. Graves says: "The Libyans, however, claim that Garamas was born before the Hundred-handed Ones and that, when he rose from the plain, he offered Mother Earth (Gaia) a sacrifice of the sweet acorn." The acorn of the oak – the oaks being representative of Dodona, of the piece of the *Argo's* prow and of the Colchian grove!

It is in the footnote of Graves<sup>10</sup> that we learn something of really immense significance to us: 'Garamas is the eponymous ancestor of the Libyan Garamantians who occupied the Oasis of Djado [see top portion of Figure 40], south of the Fezzan, and were conquered by the Roman General Balbus in 19 B.C. They are said to have been of Cushite-Berber stock, and in the second century A.D. were

subdued by the matrilineal Lemta Berbers. Later they fused with the Negro aboriginals on the south bank of the Upper Niger, and adopted their language. They survive today in a single village under the name of Koromantse.

I need hardly point out to the alert reader that the southern bank of the Upper Niger is the home of the Dogon! What should be investigated on the spot is the relations which subsist between this sad shaggy remnant of the Garamantians and the surrounding Dogon and other tribes. Also, the villagers of Koromantse might be discovered to possess the Sirius lore themselves.

On the most detailed French map of this area there is a village called Korienze only sixty miles from Bandiagara and in the heart of Dogon country. It is on the south bank of the Upper Niger and is presumably the place Graves means.

In line with this important discovery I should point out that Herodotus says in Book Two (103 and 106): 'It is undoubtedly a fact that the Colchians are of Egyptian descent

the Colchians, the Egyptians, and the Ethiopians are the only races which from ancient times have practised circumcision. The Phoenicians and the Syrians of Palestine themselves admit that they adopted the practice from Egypt, and the Syrians who live near the rivers Thermodon and Parthennus, as well as their neighbours the Macronians, say that they learnt it only a short time ago from the Colchians. No other nations use circumcision, and all these are without doubt following the Egyptian lead.'

Circumcision is fundamental to Dogon culture and forms the central part of the ritual of the Sigui which the Dogon hold every sixty years – and though I have pointed all this out earlier, it does no harm to repeat it.

We shall recall if we read the *Argonautica* that the Argonauts were blown off course to Libya, where they were stranded for some time. In his book *Herodotean Inquiries*,<sup>11</sup> Seth Benardete speaks of the Garamantes to whom he gives

an alternative name, the Gamphasantes. They are described in Herodotus, Book Four (after 178) as inhabitants of 'Further inland to the southward, in the part of Libya where wild beasts are found'. At 179 Herodotus connects Jason and the Argonauts' visit to Libya with the eventual foundation in Libya of a hundred Grecian cities. Benardete's comments (p. 122) in his book connect the *Argo's* visit to Libya and the Libyan city of Cyrene.

Herodotus first indicates how closely Libya, Egypt, Scythia, and Greece are joined. The ancestors of Cyrene's founders were descendants of Jason's companions, who sailed to Colchis, originally an Egyptian colony on the eastern shore of the Black Sea, and the third generation from these Argonauts were expelled from Lemnos by the very same Pelasgians who later abducted Athenian women from Brauron, where a cult of Artemis-Iphigeneia was practised, just as among the Taurians in the Crimea, and Jason is said to have been carried off course to Libya. Cyrene is the melting-pot of Egyptian, Libyan, and Scythian things. Its founding suggests the Scythian account of their origins. They said that golden objects fell from heaven, which flashed fire when the two older brothers of Kolaxais approached them, but Kolaxais himself was able to take them home. To these celestial *ποίηματα* [*poiemata*] there here correspond the oracular verses of Delphi which, in both the Theban and Cyrenaic versions, prompted the sending of a colony to Libya.

Robert Graves got his information<sup>12</sup> on the Garamantians going to the Upper Niger by way of Libya from a series of books by Eva Meyrowitz, an anthropologist who spent many years studying the Akan tribe of Ghana, directly south of the Dogon.<sup>13</sup> Graves paraphrases her books 'The Akan people

result from an ancient southward emigration of Libyo-Berbers – cousins to the pre-Hellenic population of Greece – from the Sahara desert oases (see 3, 3) and their intermarriage at Timbuctoo with Niger River Negroes. Timbuctoo – or Timbuctu – is the nearest big city to the Dogon. Graves continues: 'In the eleventh century AD they moved still further south to what is now Ghana.' I might point out that the path of migration from Timbuctu to Ghana goes straight through the country of the Dogon, whose territory is directly south of Timbuctu. So it is quite clear by now that peoples intimately connected with the Sirius tradition came from Greece to Libya and thence south to the Libyan oases of the Sahara, thence further south-west past the Sahara to Timbuctu and the region of the Dogon, where they mingled with Negroes of the Dogon region and took their local language for themselves, eventually becoming indistinguishable from the local African population in appearance and speech, but retaining their old traditions as their most secret doctrines. The migration route is shown in Figure 40.<sup>14</sup>

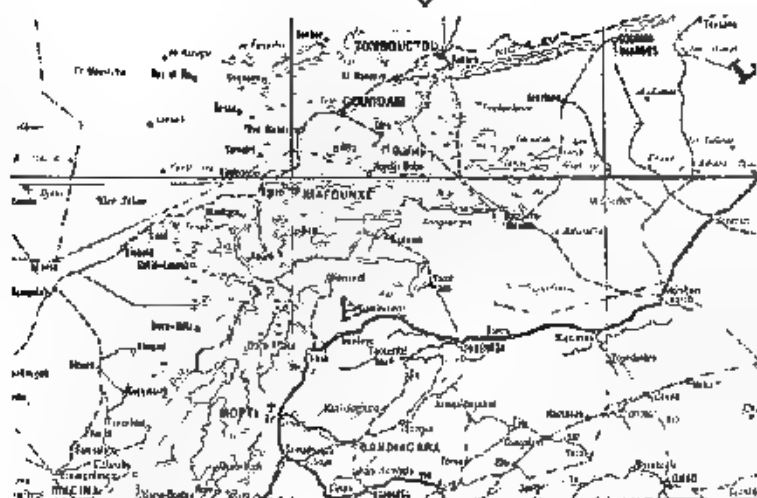
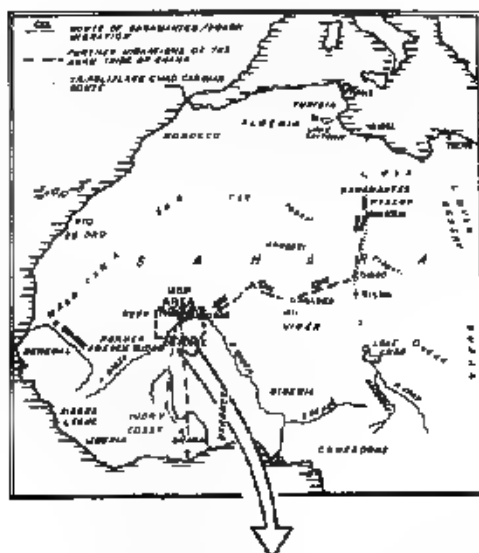
There is something incredible in the survival of the Argonauts in the obscure reaches of the French Sudan. These people, which I assume must include the Dogon as well as their immediate southern neighbours (and the Dogon sell onions to Ghana as part of their livelihood), seem to be direct descendants of Lemnian Greeks who claimed to be the grandsons of the actual Argonauts. It almost seems too amazing to be true, that we should have begun this book by considering a strange African tribe then considered similar Sirius traditions in the Mediterranean stemming from ancient Egypt, and then be led back again to the African tribe whom we discover to be directly descended from the Mediterranean peoples privy to the Sirius complex!

Later, I shall mention a bit more about the Pelasgians, who lived in Arcadia and, so Herodotus informs us, were not conquered by the Dorian invaders of Greece in pre-classical





## THE S R I U S M Y S T E R Y



**Figure 40** Migration route of the Dogon



*Figure 91* Artemis stands by as the infant Apollo, held by their mother Leto, lets fly an arrow at the Python. This scene is not Delphi but Delos, for the palm trees are the 'tree-code' of Delos. This Attic vase painting provides important confirmation that the story, which was supposed to have occurred at Delphi, was also linked with Delos. If Python was not only at Delphi but at Delos as well, then Python is a concept rather than a creature. This is all further evidence for the genodetic oracle-octave which includes both Delphi and Delos which are one degree of latitude apart. Delos had ceased to have any function as an oracle centre by about 600 BC, which helps one appreciate the antiquity of the system, since Delos had no oracular functions at all by the time of classical Greece, when Socrates was gadding about the agora in Athens.

the shrine of Ammon equivalent to the Dodona oracle of Zeus, where the other of the two birds flew from Egyptian Thebes. And Athene, the daughter of Zeus, is equivalently the daughter of Ammon, who is identified with Zeus.

Athene was also known as Pallas Athene — or reasons given in Graves. He adds that 'the third Pallas was father of 'the fifty Pallantids, Theseus's enemies (see 97 g and 99 a), who seem to have been originally fighting priestesses of Athene' Once again the fifty.

Graves gives some interesting information.<sup>16</sup> 'Pottery finds suggest a Libyan immigration into Crete as early as 4000 BC, and a large number of goddess-worshipping Libyan refugees from the Western Delta seem to have arrived there when Upper and Lower Egypt were forcibly united under the First Dynasty about the year 3000 BC. The First Minoan Age began soon afterwards, and Cretan culture spread to Thrace and Early Helladic Greece.'

While again on the subject of the fifty, I want to note more information concerning Cerberus, the fifty-headed hound of Hades Graves says.<sup>17</sup> 'Echidne bore a dreadful brood to Typhon: namely, Cerberus . . .', etc. Recall that Typhon was identified with Python<sup>18</sup> in the *Homeric Hymn to Apollo* and elsewhere, Python was the particular monster, slain by Apollo according to legend (as depicted in Figure 41), whose rotting corpse lay directly under the oracle of Delphi.

Graves continues: \*'Cerberus, associated by the Dorians with the dog-headed Egyptian god Anubis who conducted souls to the Underworld, seems to have originally been the Death-goddess Hecate, or Hecabe; she was portrayed as a bitch because dogs eat corpse flesh and howl at the moon. Orthrus, who fathered [various creatures] on Echidna\* was Sirius, the Dog-star, which inaugurated the Athenian New Year. He had two heads, like Janus, because the reformed year at Athens had two seasons, not three.' The three heads of Hecate, of Cerberus in his simplified form, etc., possibly all represent the old, original year which had three seasons and originated in Egypt with the the seasons of their (1) inundation, (2) sowing, (3) harvesting, which were traditional there. But it seems unlikely. For why would the three goddesses sail in their Sirius boat in Egyptian representations which have absolutely nothing to do with a calendar? In

\* Mother of the dog Cerberus and wife of Typhon — see later, p. 431

short, the three goddesses and the three-headedness always to do with Sirius are not calendrical at all. But by the extremely late (post-Classical) times of Athens, calendrical explanations may have become fashionable for what could not otherwise be explained.

In the above passages I hope the reader will note the specific information that connects Anubis (which much earlier I identified on altogether separate grounds with the orbit of Sirius B) with the Greek version of Anubis, Cerberus, with his fifty heads. In the Egyptian tradition I hadn't found any specific connection between Anubis and fifty. It is true that we have found the Egyptian word *qet* means both 'oarsman' and 'orbit', and as there were always fifty oarsmen in the Sirius-related boats, both in Greek and Sumerian saga, we were on our way to an identification on solid grounds. But here at last a specific connection has come to light, and would seem to be a splendid confirmation of my identification! And furthermore, we see that the dog Orthrus who was the brother of Cerberus, was specifically identified with Sirius. We thus have found in the Mediterranean world all the elements of the description of the Sirius system which were possessed by the Dogon. And we have also traced the Mediterranean Sirius lore to the Dogon by way of Libya, then the Saharan oases, then Timbuktoo, and finally the south bank of the Upper Niger and the Dogon region. Thus, through thousands of miles and thousands of years, we have discovered the source of that strange tradition still intact among a tribe deep in Africa. But there is more to be learnt. We must examine the Mediterranean tradition more closely, and particularly its oldest Egyptian origins in the shadowy pre-dynastic world of Behdet (which seems not to have been excavated and has presumably been lost in the mud of the Nile delta).

The father of Orthrus the Sirius-dog and his brother Cerberus the fifty-headed dog was the monster Typhon

whom we mentioned a moment ago (see Figure 49, later on). And it is worth while for us to see what Liddell and Scott's *Greek Lexicon* has to say about the meaning of the name Typhon and also related forms of this word

One meaning of Τυφών (*Typhon*), curiously enough, is 'a kind of comet'—in other words, a moving star. Another form is either Typhoeus or Typhos and specifically refers to the youngest son of Gaia, who was mother also of the three fifty-headed monsters and of Garamas. *Typhlos* means 'smoke, vapour', and also conceit, vanity (because it clouds or darkens a man's intellect). *Typhlos* means 'blind' and specifically 'in the sense of misty, darkened'. The verb *Typhloo* means 'to blind, make blind' or 'to blind, baffle'. It also means 'to wrap in smoke'.

Since Typhon is specifically said to be the father of Sirius (Orthrus) and one of its unexplained definitions is a description of a moving star, and its son has fifty heads, I take all the references to obscurity and invisibility to mean that Typhon represents Sirius B which is the dark companion of Sirius and is invisible to us. In other words, we are *typhlos* (blind) to Typhon because it seems as if it were obscured or *typhloo'd* by *typhos* (vapour, smoke), and we are baffled, blind (*typhlos*) in the sense of the subject being darkened (*typhloo*).

A possible origin of the word Typhon may be the Egyptian word *tephut* or *teph-t*, both of which have the meaning of 'cave, cavern, hole in the ground'. This Egyptian word describes perfectly the chasm at Delphi in which Python was supposed to be rotting, his corpse giving off the fumes out of the earth. And, as we have seen, Python was equated with Typhon in early times.

If we take the Egyptian word *tep* we discover that it means 'mouth' and in the form *tep-ra* it means 'mouth of the god' literally, but in fact the real meaning of this is 'divine oracle'. *Tep* is an unaspirated *teph*. Hence the *tep* of Delphi has a *tephut*, or cavernous abyss beneath it. Later I shall consider

the Egyptian word *tep* in its further ramifications. But for the moment it is sufficient to see that Typhon almost certainly originates from the Egyptian word describing a cavern or hole in the earth, as the Egyptians founded the *tep* or oracle at Delphi and naturally used their own word to describe the cavern. As Delphi passed into Greek culture and the Egyptians became forgotten in all but vague legends (such as the famous visit of the Canopic Herakles to Delphi, etc.), the original word to describe Delphi's cavern would have been retained through the natural conservative inclinations of religious organizations who retain antique words and language for notoriously long periods of time, forgetting their origins. Hence a Greek who had no knowledge of Egyptian culture or that it had ever penetrated to his homeland in earlier days would nevertheless call the cavern at Delphi which produced the sulphurous fumes the den of Typhon after its original Egyptian designation of *tephat*. It has been noted by people other than myself and with greater knowledge that the Sumerian word for cavern, *abzu*, survived in Greek as *abyssos*, leading to the English *abyss*.

The fumes arising from the Delphic cavern obviously gave rise to the usage of forms of the word for 'obscuring with smoke, dark', etc. And the fact that the personified Typhon became closely associated with Sirius was obviously due to the fact that this word which had entered Greek usage and been extended to considerations of 'darkness, obscurity', was useful in the traditional Sirius lore as adopted in Greece. The other meanings for the word then developed from there, except for the obvious popular usages, such as applying the word to a description of 'vanity' because vanity clouds a man's intellect—a really superb extension of the meaning for use in poetic and common expression.

It is probably due to considerations such as the Typhonic in the sense of Sirius B's association with darkness and obscurity, and hence with cavernous blackness, that some of the

Sirius-related divinities were reputed in later times to live in the dark underworld. The prototype of these is quite specifically Anubis, the embalmer of mummies. Anubis was not originally meant to be a death god *per se* and his association with mummies and the underworld has been previously explained. Egyptian mummies were, as I have said, embalmed over a period of seventy days, to correspond with the number of days each year when the star Sirius was 'in the Duat, or Underworld', and was not visible in the night sky. Hence the seventy-day 'death' of Sirius each year was the fundamental and earliest underworld aspect of the Sirius lore. Of course, Anubis, as the expression of the orbit of Sirius B, was invisible all the time, and not only for seventy days a year. Hence the permanent Typhonic darkness could be even further extended in later lore and a heightened sense of the importance of the underworld aspects could arise. This concept of invisibility and darkness must have become more and more important as time went on and the grasp of the nature of the mysteries became weakened by successive generations of initiates who were further and further from the original sources of information, though the Dogon even down to our time have maintained the information in a remarkably pure state. So there developed the underworld nature of the fifty-headed Cerberus-Anubis in Greek times. With the earlier Egyptians, as always with them, the underworld concept had been on more than one level. To the public the underworld aspect seemed to be entirely explicable by the disappearance of Sirius for seventy days—a fact which any one could notice—and its reappearance following that period at dawn on the occasion of the star's heliacal rising. But the priests knew that the dark companion of Sirius was *never* visible.

It would be worth while now to look a little more closely at the dog Orthrus, who was Sirius. Orthrus is the dog of Eurytion, the herdsman of the triple-bodied monster



Geryon, who lived on the island of Erytheia in the far west, father of one of the Hesperides. Herakles was told to steal his cattle.) Graves interestingly compares this Eurytion with the Sumerian Enkidu, the companion of Gilgamesh who was hairy and wild and came from the steppes and was imbued with incredible strength.<sup>20</sup> 'Eurytion is the "interloper", a stock character. The earliest mythical example of the interloper is the same Enkidu: he interrupted Gilgamesh's sacred marriage with the Goddess of Erech [Uruk], and challenged him to battle.' It is particularly interesting to find the Greek companion of Sirius compared by Graves to the Sumerian Enkidu, whom I also have identified with the companion of Sirius. For 'companion of Sirius' is precisely what Eurytion is, if Orthrus is Sirius and Eurytion the herdsman accompanies him, then Eurytion is the companion of Sirius. And Enkidu is the strong hairy wild man who endured a trial of strength against Gilgamesh and became his companion after their wrestling match. Both Eurytion and Enkidu are hairy and rustic characters, and they seem to be related also to the god Pan, whose hairy and rustic nature classes him with them.

The motif of 'interloper' and 'interrupting' and of challenging to a test of strength has to do with the fact that the bright star Sirius is challenged by its strong companion star. Graves adds, 'Another interloper is Agenor' and Agenor means 'very many.' He interrupted the wedding of Perseus with Andromeda. Perseus was the son of Danae, great granddaughter of Danaos, who had fifty daughters. As we learn in Graves,<sup>21</sup> Danae herself had connections with an ark. Her father locked her and the infant Perseus in a wooden ark, which he cast into the sea. Later companions of Perseus in his exploits were 'a party of Cyclopes'.<sup>22</sup> This is yet another familiar ingredient.

Perseus fell in love with Andromeda, the daughter of Cassiopeia (Queen of Ethiopia). Graves says <sup>23</sup> 'Cassiopeia had boasted that both she and her daughter were more

beautiful than the Nereids, who complained of this insult', etc. And, of course, the number of the Nereids was fifty. Of them, Graves says.<sup>24</sup> 'The fifty Nereids seem to have been a college of Moon-priestesses' Graves explains the recurring fifty in relation to moon lore. It is a brave but, again, unconvincing solution.

It is interesting in the light of our knowledge of Danaus having fifty daughters to read the opening of Pindar's tenth Nemean\* Ode<sup>25</sup> which is written largely about the city of Argos (a name related to Argo just as was the name Argos of the Argo's builder and as was the word 'ark')

The city of Danaos  
And his fifty daughters on shining thrones,  
Sing of it, Graces,  
Of Argos, home of Hera, fit for the gods

Perseus and Danae also have a connection with Argos. And as for the Graces here mentioned, their worship was first instituted at Orchomenos. The Graces are often associated with Hermes and called 'the Graces of Hermes' which occurs especially in a work such as *The Lives of the Philosophers*<sup>26</sup> by the historian Eunapius. He tells us something extremely interesting about the area of Behdet and Canopus in Egypt. In speaking of Antoninus, the son of the remarkable and brilliant woman Sosipatra (fourth century AD), Eunapius says. He crossed to Alexandria, and then so greatly admired and preferred the mouth of the Nile at Canopus,<sup>1</sup> that he wholly dedicated and applied himself to the worship of the gods there, and to their secret rites.<sup>27</sup> And also 'Antoninus was worthy of his parents, for he settled at the Canobic mouth

\* Odes celebrating the Nemean games, held at the city of Nemea.

<sup>1</sup> The alternative spelling to Canopus of Canobus is sometimes used by other authors.

of the Nile and devoted himself wholly to the religious rites of that place'.<sup>28</sup> This is interesting, that there were rites peculiar to Canopus to which one could exclusively devote oneself. A little later,<sup>29</sup> Eusebius mentions that the Christians destroyed the temples in the vicinity and demolished the Serapeum at Alexandria, and settled their black-robed monks on the spot of Canopus in order to supplant paganism there. Hence, we see that that particular place had a unique importance. Surely it should be excavated. The pagan mysteries of the place, eventually destroyed by the Christians, probably continued the Behdet tradition and were related to our Sirius question.

But back now to the quotations from Pindar given above. What is so especially significant about this passage of Pindar's is the expression 'and his fifty daughters on shining thrones'

It will be remembered that the throne  is the hieroglyph

for Ast or Isis identified with Sirius, and that the fifty Anunnaki of Sumer were on thrones. All through the earlier traditions there has been a great deal of emphasis on the throne in connection with the Sirius material, and here in the late Pindar we find the same. By describing him as 'late' I do so on our Sirius time-scale, for of course he was at the very earliest portion of the Greek classical age.

There are further connections between the Sirius system and Argos and Danaos. Connections with the Minyan Libyans are many. The father of Danaos was himself 'the son of Libya by Poseidon'.<sup>30</sup> Danaos was also 'sent to rule Libya'.<sup>31</sup> However, the connection with Egypt is also strong. Danaos's twin brother was called Aegyptios, of whom we read<sup>32</sup> 'Aegyptus was given Arabia as his kingdom, but also subdued the country of the Melampodes [the 'black footed people' - the Egyptians], and named it Egypt after himself. Fifty sons were born to him of various mothers. Libyans,

Arabians, Phoenicians, and the like.' So we see Danaos's twin brother had fifty sons. And Danaos had fifty daughters. This finally abolishes Graves's argument that they must refer to a college of fifty moon-priestesses, and emphasizes the connection with the fifty male companions of Gilgamesh, fifty male Argonauts, fifty male Anunnaki, etc. Notice the two related but also quite definitely separate groups of fifty here. Together they add up to a hundred – a *hecatē* – and have the same grandparents, but they are basically two separate fifties. Not only do they have separate parents and especially separate fathers, but they are separately distinguished by sex. In this connection we should remember that Sirius C is called by the Dogon 'the star of women'. Its 50-year orbit around Sirius A could be symbolized by 50 daughters, while the male Sirius B's orbit would be symbolized by 50 sons.

Danaos learns that his brother wishes to marry his fifty sons to Danaos' fifty daughters with the aim of their killing the fifty daughters after marrying them. So Danaos and his daughters all take flight to Rhodes\* and then to Greece where they land and Danaos announces that he is divinely chosen to become the King of Argos. Note that he chooses Argos. This and his connection with fifty are especially important later when I give the derivation of the words Argos, Argos, etc. And it is particularly interesting that when Danaos flees his brother, he does so in a ship which he built with Athena's assistance – exactly the case with the Argonauts, who built the *Argo* with Athena's assistance.

The way in which Danaos became King of Argos was that a wolf came down from the hills and killed the lead bull of the city and the Argives accepted the omen. 'Danaus, convinced that the wolf had been Apollo in disguise, dedicated the

\* This may be an indication that Rhodes, at latitude 36° 30', does indeed belong in the sequence of oracle centres as was only tentatively suggested in the chart at the end of Chapter Six.

famous shrine to wolfish Apollo at Argos, and became so powerful a ruler that all the Pelasgians of Greece called themselves Danaans. He also built the citadel of Argos, and his daughters brought the Mysteries of Demeter, called Thesmophoria,\* from Egypt and taught these to the Pelasgian women. But, since the Dorian invasion, the Thesmophoria are no longer performed in the Peloponnese, except by the Arcadians.<sup>13</sup>

It is well known that the Pelasgians survived in Greece only in remote Arcadia after the Dorian invasion of circa 1100-1000 B.C. This is why some of the older traditions continued in that strange region after they had ceased to exist elsewhere in Greece. Arcadia was in a sense the Wales of Greece. The Pelasgians considered themselves 'earth-born', as I shall discuss in a moment. Note that there is a specific reference to Egyptian mysteries being transplanted in Greece among the Pelasgians. When Danaos fled from Egypt to Argos, he is specifically said to have brought Egyptian mysteries, the Thesmophoria. Presumably the Sirius-complex was thus transplanted (Herodotus tells of Danaos bringing the Thesmophoria to Greece in Book II, 171)<sup>14</sup> The element of the wolf, sometimes substituted for the dog in the Sirius tradition of the Dog Star, is important. It is an obvious European substitute for the jackal of Anubis. With no jackal in Europe, the wolf was the candidate. Wolfish Apollo is jackalish. It was from this changing of the jackal into the wolf through adaptation to the European clime that those peculiar wolf traditions arose in wild Arcadia which developed in pre-classical times into the werewolf concepts. Human blood-sucking vampires, the use of garlic for protection against them, and lycanthropy or werewolves all luxuriated in

\* *Thesmophorus* in Greek means 'aw-giv-ing'. By Classical times the Thesmophoria was an annual festival at Athens held by women in honour of 'Demeter Thesmophorus' because she founded the institution of marriage.

the wilds of Arcady among the Pelasgian survivors in pre-classical Greece after the Dorian invasion. The phenomenon is rather like the plethora of fairy-tales and 'Celtic twilight' to be found in Ireland, with the multitude of fantastic stories and creatures. What is a werewolf? It is a man's body with a wolf's head. That is exactly what Anubis became when transferred to Greece, instead of a man's body with a jackal's head, he was a man with a wolf's head because there was no jackal in Greece. And the temples of Wolfish (or Lycian) Apollo, were not altogether rare in Greece. Aristotle's famous school at Athens, the Lyceum, was in the grounds of the Lycian Apollo's temple just outside the Athens Gate of Diochares. The name 'Lyceum' comes from the Lycian Apollo, which is the Wolfish Apollo.

It is extremely interesting, incidentally, to read in Pausanias (Book II, 38, 4) that near Argos 'are the Landings, where they say Danaos and his sons first landed in the Argolid' (The Argolid was a region of Greece around Argos.) Here we read that Danaos had sons, not daughters. This is a strong indication that what was really meant to be significant about Danaos's progeny was not their sex but their number of fifty. And from Pindar we see that they were on fifty thrones. The fact that Aegyptus of Egypt had fifty sons as well and that Danaos's daughters (or sons) taught the Egyptian mysteries to the Greeks all indicates that what transpired was a transplanting from Egypt to Greece of the all-important tradition to be common to both countries from then on – the fifty as linked with the Dog Star Sirius and as celestial thrones. In other words, the mystery of the orbit of Sirius B around Sirius A in its fifty celestial steps.

According to Graves,<sup>35</sup> the serpent's teeth sown by Jason were 'a few left over from Cadmus's sowing at Thebes'. Graves says of the latter <sup>36</sup> 'A small tribe, speaking a Semitic language, seems to have moved up from the Syrian plains to Cadmeia in Caria. Cadmus is a Semitic word meaning

"eastern" whence they crossed over to Bocotia towards the end of the second millennium, seized Thebes, and became masters of the country. The myth of the Sown Men. But before continuing his explanation I shall quote his description of the events. Figure 42 depicts an ancient Greek vase painting of Cadmus standing above a hare, just as Orion 'stands' on Lepus, the Hare, in the night sky.

Graves tells us.<sup>37</sup>

Cadmus sailed with Telephassa to Rhodes [where Danaos also stopped in his flight to Argos], where he dedicated a brazen cauldron to Athene of Lindus, and built Poseidon's temple, leaving a hereditary priesthood behind to care for it [Like Danaos, Cadmus instituted religious rites where he went.] They next touched at Thera [the place from which the Minyae later left their settlements there to go to Libya], and built a similar temple, finally reaching the land of the Thracian Edonians, who received them hospitably. Here Telephassa [who was Cadmus's mother and whose name means 'far shiner', her husband and Cadmus's father was 'Agenor, Libya's son by Poseidon and twin to Belus (who) left Egypt to settle in the land of Canaan, where he married Telephassa, otherwise called Argiope ("bright-face"), who bore him Cadmus', etc. And notice the name Argiope, related as it is to what we will discuss in a moment as the *Argo*-complex of words and the related meaning of *argent*, silver, taken here as the shade of meaning from this large *Argo*-complex.] died suddenly and, after her funeral, Cadmus and his companions proceeded on foot to the Delphic Oracle. When he asked where Europe (his lost sister) might be found, the Pythoness\* (of Delphi) advised him to give up his search

\* Another name for the Sibyl at Delphi.



*Figure 42* An extremely important representation, in the Louvre, of Cadmus of Greek Thebes, slaying the serpent/dragon. Its teeth are almost more prominent than it is. Cadmus seems to represent the constellation Orion, for beneath his feet figures prominently a hare which appears to be meant as the constellation Lepus. As if to emphasize the stellar symbolism, on either side of Lepus are what appear to be stars. The serpent itself, to the left and slightly lower than Cadmus, would therefore correspond with the position in the sky of Sirius. (Figure 14, earlier in this book, shows a star map of this area of the sky which will help in visualizing the constellations, though the conventional figures of a man, a hare, etc., are not drawn in.) Since we know that Cadmus and Jason were the two heroes who sowed the serpent's teeth, and this serpent has prominent rows of teeth (notably not fangs, the emphasis instead being upon the rows,, and the serpent is placed in the position of the star Sirius in this pictorial star-map, we have evidence (if we accept the star-map interpretation) that the Greeks must have been conscious of the Egyptian pun whereby 'serpent's tooth' in hieroglyphics is a synonym for 'the Goddess Sirius'. The doves and the shrine with serpents are both elements of the oracle centres associated with the Sirius tradition in Greece.



and, instead, follow a cow and build a city wherever she should sink down for weariness. at last (the cow) sank down where the city of Thebes now stands, and here (Cadmus) erected an image of Athene, calling it by her Phoenician name of Onga. Cadmus, warning his companions that the cow must be sacrificed to Athene without delay, sent them to fetch lustral water from the Spring of Ares [Mars], now called the Castalian Spring, but did not know that it was guarded by a great serpent. This serpent killed most of Cadmus's men, and he took vengeance by crushing its head with a rock. No sooner had he offered to Athene the sacrifice than she appeared, praising him for what he had done, and ordering him to sow the serpent's teeth in the soil. When he obeyed her, armed Sparti, or Sown Men, at once sprang up, clashing their weapons together. Cadmus tossed a stone among them [just as Jason later did] and they began to brawl, each accusing the other of having thrown it, and fought so fiercely that, at last, only five survived. Echion, Udaeus, Chthonius, Hyperenor, and Pelorus, who unanimously offered Cadmus their services. But Ares demanded vengeance for the death of the serpent, and Cadmus was sentenced by a divine court to become his bondsman for a Great Year.

Note here that the serpent's teeth motif is again linked with the concept of fifty. For the Great Year is a hundred months long and consists of two separate cycles of fifty months, as I have mentioned before. It is just as well for us that Hyginus and Apollodorus have preserved this interesting bit of information which Graves has passed on from them. The 'Spring of Ares' resembles 'the grove of Ares' where the golden fleece was hung, and both were guarded by serpents. And in both the story of the *Argo* and this story, the hero throws a stone in the midst of the sown men. the stone motif

again, a thrown stone being central to the Deukalion story and to the Orchomenus ghost, etc. (see page 221-2). And it was a stone with which Cadmus crushed the serpent's head as well.

The cow in the Cadmus story is also reminiscent of the Egyptian sacred cow Hathor, who was identified with Isis. *Hathor* is the form we use for the original Egyptian *He-t Her*, which means 'the House of Horus' (Horus is, of course, our form for the Egyptian *Heru*, or *Her*).

It is interesting that the cow Hathor — 'House of Horus' — is identified with Isis, who, as Sothis, is the star Sirius and who is also the Mother of Horus. Hathor seems to be meant to represent the actual Sirius system, the 'house' or area in the celestial regions. And significantly the sister of Isis, Nephthys, whom I have earlier identified with Sirius B, the dark star of the system, is our form for the original Egyptian *Neb-t-He-t*, which means 'Lady of the House'. The reader will recall a previous discussion of the word *Neb* meaning 'Lord'. *Neb-t* is merely the female form of the word, and means 'Lady'. And presumably the house of which Nephthys is the Lady is the House of Horus. In other words, the lady is just as much a resident of the area of Sirius as is Sirius herself. Just because she is the dark sister does not mean that she is not quite as much at home in the House of Horus as Isis.

So much for the cow who led Cadmus to the serpent's teeth. It will all make even more sense as we go along. Wait till we find out what 'serpent's teeth' really means.

Now to resume Graves's commentary on all these Cadmean adventures at Thebes.<sup>16</sup> The myth of the Sown Men and Cadmus's bondage to Ares suggests that the invading Cadmeans secured their hold on Boeotia by successfully intervening in a civil war among the Pelasgian tribes who claimed to be autochthonous ['sprung from the earth']; and that they accepted the local rule of an eight-year

# ORIGINS OF THE DOGON

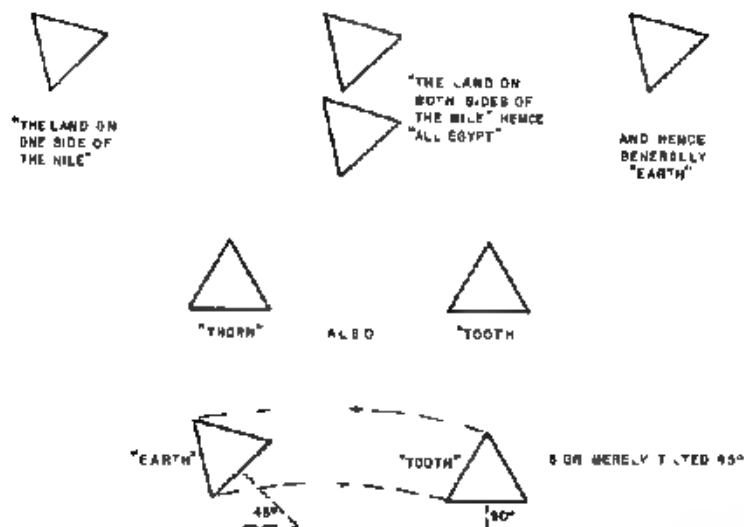


Figure 43 Hieroglyphics for tooth and thorn

[one hundred months according to Graves's lunar theories, but it really comes to only ninety-six] reign for the sacred king Cadmus killed the serpent in the same sense as Apollo killed the Python at Delphi (see 21 12). The names of the Sown Men Echion ("viper"), Udaeus ("of the earth") .

At this point I shall interrupt him once again.<sup>19</sup> Let us look at this strange name Udaeus. We should note that the similar word ὀδᾶς (*odax*) means 'by biting with the teeth' and comes from the verb root ΔΑΚ (*dak*) and its infinitive *dakēin* which means 'to bite' of dogs. Perhaps this is a clue as to the importance of *teeth*, since in Greek there was this word 'to bite' which specifically referred to the biting of dogs and it may be that this aspect of dogs was incorporated at a pre-Hellenic early date into the lore of the Dog Star by one of

those many puns which proliferated in all the high civilizations of the Mediterranean. We must, in order to understand the ancient inclinations to punning, rid ourselves of our modern prejudice against puns as a form of humour. Puns in the ancient world had no direct humorous intent. In a milieu where codes and allegories were sorely needed, puns provided the 'handles' to new ways of cloaking truths by use of synonyms. If it was a game, it was a sacred game, a *ludens*. For Thebes was the site of the Castalian Spring, as just mentioned a moment ago, and was intimately part of the milieu of the *ludi* of the ancient world.

Also, where *circe* meant 'rings', so does *daktylios* - which specifically means 'anything ring-shaped'. Thus we see another meaning in common in our complex of interweaving terms connected with Sirius traditions. A possible further example of this is in the hieroglyphics of Egypt. Wallis Budge informs us in *Egyptian Language*, in his list of hieroglyphs,<sup>40</sup> that the sign for 'thorn' (which is the tooth of a plant) is almost identical with the sign for Sothis-Sirius. The same sign tilted 45° represents *ateb*, the land on one side of the Nile, and if placed one on top of another, forming a pair, means 'all Egypt'. The very same sign is incorporated in the sign for *ārt* meaning 'jawbone with teeth'. Remember Gilgamesh with his jaw to the earth 'and his teeth shook'. Certainly this *ārt* seems to mean something. In fact, the same single sign which means 'the land on one side of the Nile' and looks like a tilted tooth, also has the general meaning of 'earth', which latter concept is so important in all the later Greek Sirius-traditions. It may well be that all these puns on the determinative hieroglyphic sign for Sirius came, in the usual way with the pun-loving Egyptian priests, to form a complicated body of Sirius doctrine involving teeth, Earth-born, ring-shaped, falcon or hawk (Circus) etc., etc. It should therefore not surprise us in the least to learn that the ancient Egyptian word for 'tooth', *āteh*, has exactly the same

hieroglyph as the word for Earth. Hence the origin, almost without question, of the connection between teeth and the Earth: in ancient Egypt they were written by the identical sign, which were tilted forms of the same sign used to represent Sirius!

# Notes

- 1 Peter Levi's translation of Pausanias, op. cit.
- 2 Graves, *The Greek Myths*, op. cit., 120.1
- 3 Ibid.
- 4 Ibid., 120.1
- 5 Larousse *Encyclopaedia of Mythology*, Paul Hamlyn, London, 1965, pp. 90-1
- 6 Lindenblad, op. cit. (see Note 2 to Chapter Two). See also further discussion in Chapter Nine
- 7 *Greek Myths*, 131 g and 13.2
- 8 Proclus on Euclid's *Elements*, op. cit. two translations, one by Thomas Taylor (1792) and one by Glenn Morrow (1960s). A translation by Thomas Taylor of much of Simplicius's commentary on Aristotle's *De Caelo* (*On the Heavens*) may be found in *The Works of Aristotle*, London, 1806-12, 3 vols. ed. trans. by Thomas Taylor and printed for the translator. However, only fifty copies were printed and not a single volume of this work is to be found either in the British Museum Library or in the Bodleian Library at Oxford. The publication was financed originally by William and George Meredith, patrons of learning at the beginning of the nineteenth century. Patrons of this kind of learning seem thin on the ground these days, since the Bollingen Foundation in New York has ceased its benefactions.
- 9 *Greek Myths*, 3 c
- 10 Ibid., 3.3
- 11 Benardete, Seth *Herodotean Inquiries*, The Hague, 1969, p. 126
- 12 See the end of his Introduction to *Greek Myths*, op. cit.
- 13 The four books by Eva Meyrowitz are now out of print. In the fourth book of the series (see Note 14) the author describes the series. 'This is the fourth volume of the series of which the first, *The Sacred State of the Akan* [1951], gives a picture of the old Akan civilization. The second, *Akan Traditions of Origin* [1952], deals with the early history of the people who now call themselves Akan. The third, *The Akan of Ghana: their Ancient Beliefs* 1958 originally entitled *The Akan Cosmogony*,

## THE SIRIUS MYSTERY

*Drama*, showed the development of their religion. The fourth, here presented, attempts to show that Akan religion, which includes the cult of the divine king and the main features of their social organization is largely derived from Ancient Egypt. Eva Meyrowitz is an anthropologist from Cape Town who worked in the Gold Coast (now Ghana) from 1936-45 studying the peoples of that country. The third volume mentioned above (1958) contains a final chapter which is entitled 'Analogies to Akan Beliefs and Customs in Libyan North Africa'. As for the Akan peoples, they speak languages of the Twi branch of the Kwa sub-family of the Western Sudanic linguistic stock and inhabit the eastern part of Ivory Coast, the southern half of Ghana, and parts of Togo. The majority are in Ghana where they settled in successive waves between the 11th and 18th centuries. All of Meyrowitz's books above, and the fourth mentioned in Note 4, were published by Faber in London.

- 14 *The Divine Kingship in Ghana and Ancient Egypt*, (originally entitled *The Akan of Ghana: the Akan Divine Kingship and Its Prototype in Ancient Egypt*), Faber London, 1960. Went out of print in February 1963. The map is adapted from one in this book.
- 5 *Greek Myths*, op. cit., 8.
- 16 *Ibid.* 8.2.
- 7 *Ibid.* 34.
- 18 *Ibid.*, 21.2.
- 19 *Ibid.* 34.1 and 34.7.
- 20 *Ibid.* 43.5.
- 21 *Ibid.*, 73.c.
- 22 *Ibid.*, 73.p.
- 23 *Ibid.*, 73.1.
- 24 *Ibid.*, 33.3.
- 25 *The Odes of Pindar* trans. by C. M. Howra. Penguin paperback, 1969. p. 176.
- 26 Eupapius, *Lives of the Philosophers and Sophists* trans. by W. C. Wright, in vol. No. 34 of Loeb Library Series (*Philostratus and Eupapius*), Heinemann, London. Harvard University Press, U.S.A. 1961.
- 27 *Ibid.*, p. 419 (text, 471).
- 28 *Ibid.*, p. 417 (text, 470).
- 29 *Ibid.* pp. 421-5 (text 472): 'Next into the sacred places they imported monks, as they called them, who were men in appearance but led the lives of swine, and open, & did and allowed countless unspeakable crimes. But thus they accounted piety, to show contempt for things divine. For in those days every man who wore a black robe and consented to behave in unseemly fashion in public possessed the power

of a tyrant, to such a pitch of virtue had the human race advanced. All this however I have described in my *Universal History*. They settled these monks at Canopus also, and thus fettered the human race to the worship of slaves. Among the unspeakable crimes being referred to was the destruction by Bishop Theodosius of the Great Library of Alexandria because it contained 'heathen literature'. Hence, the loss of the hundreds of thousands of books from the ancient world, which everyone laments so often, took place at the hands of a fanatical Christian bishop attempting to wipe out all trace of history before Christ, and not as the result of an accidental fire from the time of Mark Anthony, as the story is usually told.

30. Graves, *Greek Myths*, op. cit., 60 a.
31. Ibid., 60. b.
32. Ibid., 60. b.
33. Ibid., 60. f.
34. Loeb Library, p. 483, Herodotus, Vol. I, trans. A. D. Godley, Harvard University Press, 1960.
35. Graves, *Greek Myths*, op. cit., 132. c.
36. Ibid., 58. f.
37. Ibid., 58 e-g.
38. Ibid., 58. e-g.
39. I will complete the quotation from Graves here: "Cithonias ("of the soil"). Hyperenor ("man who comes up") and Pelorus ("serpent") are characteristic of oracular heroes. But "Pelorus" suggests that all Pelasgians, not merely the Thebans, are said to be born in this way, their common feast is the Peloria (see 2)." The remaining three names are thus seen to be quite as one would expect.
40. Wallis Budge, E. *A Egyptian Language* Routledge Kegan Paul Ltd. London, 1951 pp 43-94.

## SUMMARY

In Greek mythology there were fifty daughters of King Thestios (or Thespius, with whom Hercules (in Greek, Herakles), who is said to have been the predecessor of Jason as leader of the *Argo* and who is demonstrably derived in part from Gilgamesh, had sexual intercourse on fifty successive nights. Again, the number fifty is seen as related to intervals

of time – in this instance days instead of months – and again in connection with the complex of myths concerning Sirius.

The monsters Cottus, Briareus, and Gyges of Greek mythology each had fifty heads. Briareus was the original name of the figure later called Hercules, and as Hercules was the original Jason, it is seen that the original commander of the fifty-oared *Argo* was a fifty-headed gentleman. The name Briareus is derived from words meaning 'strength' and 'weight'. Gyges also means 'strength'. As for the name Cottus, Robert Graves says that it is not Greek. In fact, it seems to be derived ultimately from Egyptian *qet* meaning 'oarsmen' (not surprising, since Briareus was the original commander of the fifty oarsmen), and also 'orbit'. The fact that in Egyptian the words for 'oarsman' and 'orbit' are the same may explain why fifty oarsmen are symbolic of a fifty-year orbit. Oar strokes are ideal constant intervals of time combined with constant intervals of space (distance traversed) and thus perfect symbols of intervals of an orbit. In Greek the Egyptian word meaning both 'orbit' and 'oarsmen' seems to survive as the name of a fifty-headed monster. The conclusion: an orbit of fifty intervals (years) concerned somehow with Sirius and with something called 'Weight' (already known to be assigned by the Arabs to a visible companion of Sirius) – obviously, the fifty-year orbit of Sirius B is being referred to.

Garamas, a brother of the three above-named monsters, is a name also adopted by the Garamantian people. These Garamantians were Libyan residents who migrated from there by way of Algeria to the banks of the Niger River in Mali where they intermarried with local Negroes.

The *Argo* was reported to have stopped in Libya for some time, which resulted in the foundation in Libya of 'a hundred Grecian cities'. The Libyans from whom the Garamantians came are reputed to be 'descended from the Argonauts' through migrant Lemnian Greeks who settled in Libya.



These same Garamantians over hundreds – indeed, thousands – of years in their migration to Mali obviously brought to that region as the most secret and holy of all their sacred traditions the sacred Sirius tradition now propounded by the Dogon, who are presumably their descendants. (The Dogon themselves insist that they were definitely not originally native to their present homeland in Mali)

The Libyan version of the Greek goddess Athena had 'fifty Pallantids' as priestesses, with evident association at an early time with the Garamantians.

The dog Orthrus, brother of the god Cerberus who had fifty heads, was specifically identified by the Greeks with the star Sirius. Robert Graves equates Anubis, Cerberus, and Hecate with each other. This brings together Anubis-the-orbit with Cerberus the fifty-headed dog, and Hecate meaning 'one hundred', as well as Orthrus who is Sirius the Dog Star.

The father of Orthrus was Typhon, one meaning of which is 'a kind of comet' or a 'moving star'. Another meaning is 'blind' or 'darkened', that is, we see it could refer to a moving but invisible star. And his son Orthrus is clearly identified with Sirius, and had a brother with fifty heads.

Orthrus (Sirius) was the dog of the herdsman Eurytion whom Robert Graves compares with Enkidu, the companion of Gilgamesh. It is possible the name Orthrus may be derived from the Egyptian *uri* meaning 'the setting of a star'. We see this same word used in Chapter Eight in reference to the Sirius complex.

The *Argo* carried the fifty daughters of Danaos, who was 'sent to rule Libya' and had a twin brother Aegyptos, king of Egypt (which got its name from him), who had fifty sons. Sometimes Danaos is said to have fifty sons instead of fifty daughters. It was obviously their number which mattered, not their sex.

'The old man of the sea' named Nereus to the Greeks,

had fifty daughters called the Nereids (who are enumerated by Hesiod in his *Theogony*, 241). An 'old man of the sea' is reminiscent of Oannes and Enki — of amphibious wise men generally.

The Greek poet Pindar (fifth century BC) describes the fifty Danaids as 'on shining thrones', reminiscent of the fifty Anunnaki on their shining thrones, of Isis on her shining throne. (The throne is the hieroglyph of Isis who is identified with Sirius.) Danaos is also associated with the wolf- or dog-motif and that motif refers to the Dog Star, Sirius.

## CHAPTER 8

# The Rising of 'Serpent's Tooth'

It would now do to elaborate further on the points so recently made. It should be noted that in Egyptian the hieroglyph *schet* of a serpent means both 'serpent' and 'body'. The cobra hieroglyph *ārā* means both 'serpent' and 'goddess'. Elsewhere we encounter *ārā* frequently having the common general meaning of 'goddess'. The frequent incorporation of the serpent into late Sirius-tore among the Greeks probably stems from a pun or corruption of the Egyptian determinative form for 'goddess' in reference to the goddess Sothis-Isis (Sirius). In fact, if an Egyptian were to write the Goddess Sirius' in hieroglyphs, the result would be



which can also (by pun) be read quite literally as: 'serpent's tooth'. In addition to this Egyptian pun, there is a Greek pun connected with the story of Jason sowing the teeth. In Greek the word which describes the growing of a tooth from the gum is *anatolē*; a variant is *anatellō*. These words would describe the growing from the ground of the teeth, and 'to make to rise up' or 'to give birth to' is their basic meaning. However, these words are also used to describe the risings of stars and constellations. Hence, if one wanted to say that the

star Sirius was rising at the horizon, one could pun and say 'The tooth is growing up from the ground as from a gum, that is, the ground is giving birth to a tooth.' Hence all the many 'earth-born' creatures linked to the stars, and especially Sirius. As a matter of fact in translating the now lost early *Argo* tales from Greek into English it is problematical whether instead of saying 'the teeth in the ground gave birth to . . . ' etc., one should really have considered the equally literal translation 'Sirius namely "the tooth", rose over the horizon.' In short, when does a pun cease to be a pun and merely consist of a mistranslation based on ignorance of the true subject matter?

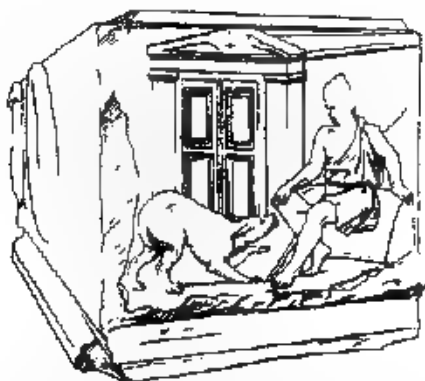
It may be that some of the puns taken over from Egyptian into Greek might have involved the same misunderstandings that ours could do with regard to translating the Greek into English. There may thus be a double layer of obfuscation between English readers and the true subject matter. Those experts in Greek mythology who may feel safe in discussing 'earth-born' mythological creatures as being sprung from the earth in a direct sense, mud and grime no doubt still caking their hides as they pop up into the air, may be better advised to take into consideration that these creatures were not meant really to be described as coming out of holes in the ground so much as rising over the horizon, due to the fact that they are stars and constellations. And if they are such cosmic figures their peculiar shapes and characteristics become immediately less bizarre and, instead, more meaningful.

We know that Colchis was the place where Helios stabled his horses and rose each morning, according to Greek mythological tradition. Since Colchis was thus the archetypal eastern rising point to the Greeks, being at the far eastern end of the Black Sea and being 'as far east as you can get' to a Greek, it actually represented 'the East'. Thus it makes sense that Jason should have sowed the serpent's teeth there. For the growing of the teeth from the ground

at that precise point was symbolic language for 'The star (goddess) Sirius, known in code as "serpent's tooth", is rising heliacally on the eastern horizon which is symbolically represented by Colchis'. And since the sun follows immediately upon the star at its heliacal rising, all the more reason that 'Serpent's Tooth' should spring up at the place where the Sun - Helios, spends the night and then rises.

The reason why the only other example of serpent's teeth being sown took place at Greek Thebes, when Cadmus sowed them there, is that Egyptian Thebes and Aea at Colchis are equidistant from Greek Thebes (see Figure 17). Hence, a probable reason for the name of Thebes being used in Greece - Greek Thebes is in a sense a 'code' for Colchis, since an action performed there may be understood as taking place within the symbolic framework of the Thebes - Colchis - Thebes triangle (Figure 17). To go to Thebes in Greece was symbolically to step onto the Colchis axis. To sow the teeth at Greek Thebes was to perform the Colchian action on Greek soil, because of the knowledge of their geodetic interrelation. This kind of thinking is based on a theory of correspondences such as the Dogon exhibit in all their most minute daily acts. In my opinion, a mind is healthy which can perform symbolic acts within mental frameworks which are not immediately obvious. A mind is diseased when it no longer comprehends this kind of linkage and refuses to acknowledge any basis for such symbolic thinking. The twentieth century specializes in producing diseased minds of the type I refer to - minds which uniquely combine ignorance with arrogance. The twentieth century's hard core hyper-rationalist would deride a theory of correspondences in daily life and ritual as 'primitive superstition'. However, the rationalist's comment is not one upon symbolic thinking but merely one upon himself, acting as a label to define him as one of the walking dead.

Greek Thebes Phthiotides—quite distinct from the main Greek Thebes—almost adjoins Iolchus in Thessaly, a few miles away, from which port Jason and the *Argo* sailed to Colchus. The voyage of the *Argo* may be seen as a symbolic journey. For to travel from Greek Thebes—either the proper one or a nominal substitute—to Colchis was equivalent to travelling from Greek Thebes to Egyptian Thebes: the distance was the same. Greek Thebes, where ‘serpent’s teeth’ were sown, is equidistant from Colchis, where ‘serpent’s teeth’ were sown, and Egyptian Thebes, where ‘Serpent’s Tooth’ was worshipped. And a ship travelling on one of the lines in effect travels on both. The voyage of the *Argo*, a later



*Figure 44.* Odysseus (Ulysses) returns home to Ithaca after all his wanderings, and is greeted by his faithful dog, Argus, the only one to recognize him. After doing so, Argus dies. This represents both the completion of a cycle (which is a meaning of the Egyptian word *arg*, from which Argus derives), and also the ability of the dog to recognize the truth to which men are blind. The dog is the symbol of Sirius, the Dog Star, because Sirius represents a higher level of perception beyond the normal senses of humans, and also a higher truth which we cannot recognize.

## THE RISING OF 'SERPENT'S TOOTH'

form of the *magan*-boat, or 'Egypt-boat', was both to Colchis and to the equidistant Egyptian centre of Thebes, where the prime omphalos was placed in the temple of Ammon.

The name of Danaos who fled Egypt with his fifty daughters (or sons) and went to Argos seems to be derived from Δανάη (Danaë) which is 'the mythological name for *Dry Earth*', according to Liddell and Scott, 'whose union with the fructifying air is expressed in the fable of Zeus and Danaë' And Danaë, as we have seen, is associated with the Sirius complex and was also set adrift in an ark. It may or may not be relevant that the Egyptian hieroglyph for wind or air, with which Danaë is supposed to have united, is a boat's sail.

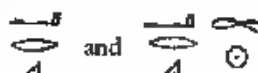
The word 'ark' itself is an interesting one worth investigating. We already know that the related word *Argo* was the ship of fifty oars which we believe symbolized Sirius B in its fifty year orbit. Could this word 'ark' also have a tie-in with the other characteristic of Sirius B, namely its strength? In this we are not disappointed. The Greek verb ἀρκέω (*arkeō*) has the meaning, according to Liddell and Scott's lexicon, of 'to be strong enough'.

The word Argus has even applied to a dog. It was the name of the old hunting hound of Odysseus (Ulysses) who recognized his master Odysseus when he finally returned from his voyages, and died as it greeted him. No one else had recognized Odysseus after twenty years' absence except for the faithful old dog, who upon greeting his long-lost master, expired on the spot, as shown in Figure 44.

Argus has also been used by the Greeks as their name for the hundred-eyed monster set by Hera to watch over Io. And it was Io the cow who led Cadmus from Delphi to Thebes where he sowed the serpent's teeth.

If the words ark, *Argo*, Argus, etc., could be construed as having an actual linguistic derivation from the ancient Egyptian (which would have had to precede by some time the Aryan invasion of India circa 1500 B.C., as the word exists in

Sanskrit, as we shall see shortly), then it might ultimately be from *arq* and *arqt* which are



These related words have various curious meanings in Egyptian and can be written many ways other than the simplest given above. *Arq* means 'to complete, to finish', in the sense of a cycle. It also means 'the last' or 'the end of anything'. For instance, *arq renpet* means 'the festival of the last day of the year'. *Arqt* means 'the conclusion of a matter'. All these meanings are reminiscent of the meaning of 'Argus' in Homer — to represent the dog who witnesses Odysseus's return and immediately dies, having seen his master's face once again after so many years. The great cycle was completed. Odysseus was home. And immediately Argus dies. Here in the earliest Greek literature we see 'Argus' used as a synonym for the Egyptian *arq*.

The Egyptian *arqt* is even more significant. Note the final determinative (picture not used as a letter) sign ☉ which is a circle with a dot in the middle. The meaning of this word is 'the end of a period, the last day of the month'. This term, then, has calendrical usage. It can be applied as well to any culmination of a period. Hera's monster Argus has a hundred eyes, and there are a hundred months (comprising two sets of fifty) to a Great Year. Here 'Argus' is a poetic synonym in early Greek tradition for *arqt*, 'the end of a period' — its culmination, its total when completed.

Our suspicion that there is a distinct reference to an orbital period of Sirius B is hinted at by the additional meaning of *arq* 'girdle', representing as it does something around a centre. *Arq* has the further verbal meaning of 'to bind around', implying specifically a revolution. The Latin *arcere* means 'to enclose' and our present day word 'arc' carries on the circular motion idea.



## THE RISING OF 'SERPENT'S TOOTH'

Not surprisingly, an *argu* is 'an educated man, a wise man, an expert, an adept' It is not difficult to realize that anyone privy to the mysteries of *arg* would have to be an adept, an initiate and wise man Hence this meaning for someone who knows about *arg*, an *argu*.

In Wallis Budge we find<sup>2</sup> a description (taken from Mau) of an Egyptian influenced Italian temple of the first century BC which contained 'seven large paintings representing Egyptian landscapes, and Io watched by Argus, and Io received by Isis in Egypt In this room the Mysteries of Isis were probably acted' So we have specific archaeological evidence that Argus of the hundred eyes was pictured on the wall of the inner sanctum of an Isis temple, and Isis was, as we know, identified with Sirius Also pictured there was Io, whom I earlier compared to the Egyptian Hathor (see p. 350) who was identified with the Sirius system, and it was of course this same Io who led Cadmus to the Greek Thebes (there being an Egyptian Thebes as well, as the reader will recall)

What were these mysteries of Isis? Well, they seem to have been related to the Thesmophoria Mysteries which the daughters of Danaos were said to have brought from Egypt to Argos For in Liddell and Scott we find that the name Thesmophoros ('law giving') was a name given to Isis The name was most commonly applied to Demeter, a Greek goddess, but was also the name of Isis in Greece In short, Isis was represented as Demeter in connection with these mysteries, but in the Italian temple referred to above was obviously represented as herself The 'fifty' and 'hundred', connected as we have seen with Danaos, are found again here in the ruins of this Italian temple, where hundred-eyed Argus is portrayed in the inner sanctum of the Isis temple The name Thesmophoros should not distract us too much It comes from Thesis, with a meaning including our *thesis* of today and *thesmos* means 'that which is laid down or

established, or instituted' And *thesmôdeô* is a verb meaning 'to deliver oracular precepts', once again a meaning which should not surprise us.\*

In Wallis Budge we read<sup>3</sup> from an Egyptian text of 'the star Septet (Sothis, the Dog Star), whose seats are pure', which is a specific reference to there being *seats* around Sirius – and, of course, there are fifty seats as we know, which led to the fifty thrones of the Anunnaki, the fifty oarsmen of the *Argo*, etc.

In Wallis Budge we also read<sup>4</sup> excerpts of Egyptian texts speaking of holy emanations proceeding from Sirius and Orion which 'vivify gods, men, cattle, and creeping things

both gods and men', and are a pouring out of the seed of the soul. Of course, the Dogon maintain the same thing in almost precisely the same terms. To them the seed which energizes the world pours forth from the Sirius system

In Wallis Budge we find also a particularly interesting bit of further information.<sup>5</sup> There we learn that the deceased spirit of a man 'goes to Nephthys' and the celestial boat. We have much earlier identified the dark Nephthys with Sirius B. It is therefore interesting to learn that as soon as the deceased visits Nephthys and his 'double' (*ka*) is recorded in heaven, he immediately 'revolves like the sun' – which I think is a pretty specific astronomical description. As he *revolves* he 'heads on the Tuat (underworld or heaven)', which is a curious turn of phrase implying a round dance or at least motion which is purposeful, and is pure of life in the horizon like Sahu (Orion) and Sept (Sirius, the Dog-star). I hope it will be noticed that the phrase here reads 'on the horizon' and much earlier I said I believed the term 'the horizon' applied specifically to the orbit of Sirius B. Here we have the

\* Plutarch in 'Isis and Osiris' (378 D) informs us: 'Among the Greeks also many things are done which are similar to the Egyptian ceremonies in the shrines of Isis, and they do them at about the same time. At Athens the women fast at the Thesmophoria sitting upon the ground.'<sup>5</sup>

deceased revolving like a sun in a purposeful way in 'the horizon' I don't think the Egyptians could possibly have been more specific and clear than this Wallis Budge comments 'The mention of Orion and Sothis is interesting, for it shows that at one time the Egyptians believed that these stars were the homes of departed souls.'

Having learned this (a belief held as well by the Dogon, as we know), let us return to our word *ārg* which I believe to be the origin of *ark* and *Argo* and *Argus* in Greek, all of which I claim are related to Sirius. Perhaps the reader will not be too amazed if by now I inform him that *ārg heh* is a 'necropolis' and *ārg-hehitt* is 'the Other World' — which we have just this moment learned was located by the early Egyptians at the star Sirius! (Also remember that the guardian of the necropolis in Greek was a *ceres* in the *Argo* story.)

*Arg* has the further meaning of 'a measure', possibly because spirits are normally measured in *Ārg-hehitt*.

And for final touches of mystery, I will add that *ārg* can mean 'to wriggle (of a serpent)' from 'binding around' and *arg ur* is the word for that mystery of mysteries, the Sphinx!

The same word means also 'silver', and Wallis Budge claims that the Greek *ἀργυρος* (*argyros*) is derived from it, which gave us our heraldic term *argent* and the country's name *Argentina*. Since this term in Greek is derived from *arg ur* (*ur* means 'chief' or 'Great'), in the opinion of an eminent expert, I believe there is no objection then to my suggestion that the other Greek words came from *ārg* and its forms.\* But, as I said, this derivation is one which entered Indo-European from Egypt before the Aryan invasion of India, for in Sanskrit *ārksa* means 'stellar, belonging to or

\* In discussion with Professor Oliver R. Gurney of Oxford, who was sceptical of Egyptian origins of Indo-European words, I found that he considered Wallis Budge's suggestion possible on two bases. (1) The word is a technical one. (2) my explanation of the Colchian connection as providing a geographical forum for such linguistic influence.

regulated by the stars or constellations', and *āraksha-varsha* is 'a stellar year or revolution of a constellation'. This is very similar to the meaning in Egyptian of 'the end of a period', and a calendrical application to the end of a month. In Sanskrit again *arka* means 'belonging or relating to the sun'. *Arkam* means 'as far as the sun, even to the sun inclusively'. *Ārkt* has become a name for Saturn, thought at that time to be the most distant planet. *Ar* means 'to shine, be brilliant', and can mean 'to cause to shine'. *Ārkita* means 'radiant with light'. *Arka* means 'a ray' and is also a religious ceremony. An *arkakara* is a 'sunbeam'. *Arkaja* means 'sun-born, coming from the sun', and it and *arkanandana* can be applied to the planet Saturn. *Arkaparna* is the name of a snake demon. *Arka-putra* is also Saturn. Forms of the word relate also to various specific astronomical events and the Arka ceremony and the arka plant which has 'a grain of fruit of some importance,\* reminding one of all the grains of the Dogon (which one learns about by reading more about the Dogon than I have given in this book), particularly the grain *Digitaria* which gave its name to Sirius B among the Dogon in their own language, of course.

*Arca* means 'worship, adoration'. *Arjuna*, besides being the famous Hindu mythical personage, means 'white, clear' and 'made of silver' – this latter being clearly a form of *argur*, the Egyptian variant form of *arg* meaning 'silver', which I mentioned a moment ago and which, according to Wallis Budge, has the cognate in Greek which was just mentioned, *argyros* meaning 'silver'.

And as Argo is a constellation in the sky, it should not be a surprise to us to find that in India the Sanskrit *Arjuna* refers to a specific Vedic constellation. (The Vedas were the earliest Sanskrit texts, and gave their name to the initial Aryan resi-

\* *Calotropis gigantea*, of the family *Asclepiadaceae* closely resembling the Dogbane family

dence in India.) The actual name of the constellation is *Phalguni*. *Phala* means 'grain' or 'seed'. The *Phal grantha* is a work describing the effects of celestial phenomena on the destiny of men.

There is also a connection of the Sanskrit with an expression involving a thigh, in Greek, *Arktos* became a name for our constellation Ursa Major, which was known to the Egyptians as 'the thigh' — the Egyptians often drew pictures of it as a bull's thigh.

There has not been room either in the original edition or in this revised (1997) edition to publish my appendix entitled 'An Explanation of the "Laryngeal Theory" of Hittite'. However, I have worked out an explanation for this celebrated linguistic problem which was originally suggested by the problem which we have just discussed, of the *ark* words. The Hittite cognate for *argyros* 'silver' is the word *harkē* 'white' (The Tocharian cognate is *ārka*, the Sanskrit is *āryama*). I became interested in the strange Hittite letter which was a mysterious lost guttural sound called 'a laryngeal.' After a time, this laryngeal sound disappeared from Hittite, and it is not known in any other of the Indo-European languages. I therefore made a survey of eight examples of Hittite words containing the laryngeal and was able to demonstrate that all of them appear to have had origins from Egyptian words containing strange guttural sounds which the Hittites had tried to accommodate with their laryngeal *h*. The Hittite words were: *harkē*, *iṣṣai/iṣṣiya* ('to bind'), *paḥḥi* ('to protect'), *nemahḥi* ('renew'), *esḥar* ('blood'), *ḥastai* ('bone', from which comes osteopathy!), *paḥḥur* ('fire', from which comes pyre), and *ḥanti* ('in front of' from which comes 'anti-'). The Egyptian origins of all of these terms are: *arg ur* ('silver'), *m'sham* ('bindings of a bow'), *pa-aa-n-ursh* ('guardian', Coptic is *panourshe*), *n'uatsh* ('to be young and new on account of'), *tesher* ('blood'), *qes/qas* ('bone'), *pū u* ('flames'), and *kheni* ('in front of'). I suggested that a military

force from Egypt had come into prolonged contact with the Hittites and most of these words such as 'blood', 'bone', 'flames', 'protect', 'bind', 'occupying a front position', formed part of a common idiom for soldiers and had been adopted into Hittite as a result. From thence they made their way into most of the Indo-European language before the Aryans migrated to India. The laryngeal sound, I suggested, was adopted by the Hittites to try and pronounce such weird Egyptian sounds as deeply-breathed *a* and *κ* vowels and gutturals like the Egyptian *q* and *kh* sounds. I worked out this solution to the laryngeal theory of Hittite in about 1973 and only now 24 years later am I mentioning it in this brief form, which is better than not mentioning it at all, I suppose. It seems to me notable that the solution to the problem emerged from the position which I took on the *ark* words as being derived from Egyptian, and I look upon it therefore as an unexpected confirmation of the soundness of that viewpoint.

If the reader can bear some other words, I propose to consider a few which are important in other ways. I beg to refer again to the work of Wallis Budge, which is becoming rather familiar to us now,<sup>a</sup> since I have cited it so frequently in recent pages. The reader must realize that we are nearing the end of the matter and summon his last reserves of patience for the final trudge across hieroglyphic soil, craggy though it may be.

In Wallis Budge, then,<sup>b</sup> we find a passage from one of the Pyramid Texts\* where Osiris is described in his role of husband of Sothis (Surtas) and implored: 'Be not wroth in thy name of Tchenjeru.' This plaintive plea must be examined. What on earth is so terrible about this 'Tchenjeru'? Well, to begin an explanation, the word *ṯchentḫ* means 'wrath, anger'. So that is obviously the meaning of the word. But we have to continue to pursue this.

<sup>a</sup> Texts inscribed on the walls of passages in some of the Pyramids. The archaic language 'thou, etc.' is an affectation of the translator.

## THE RISING OF 'SERPENT'S TOOTH'

Shortly afterwards in the same Pyramid Text we read of the birth of Horus the son of Osiris, by Sothis. 'Horus-Sept [Horus-Sirius] cometh forth from thee in the form of "Horus, dweller in Sept [Sirius]" Thou makest him to have a spirit in his name of "Spirit, dweller in Tchen-teru"'

Here we have an interesting new light on this Tchen-teru which seemed so important for no reason which was immediately apparent. It is something to do with Sirius. What, then? Obviously the close association of the place Tchen-teru and the Sirius system led me to investigate the word and its related forms.

I found that *tchen-teru* means 'throne'. I found that *tchen-teru* means 'beam (of a ship)' - second significant meaning. And I discovered a third. Namely, that *tchen-teru* means 'weight, heavy'. This was just too much to be coincidence. We first have the Sirius system described as being the place Tchen-teru and then discover that that word in related forms means three strictly Sirius-related things: 'throne', 'beam of a ship', and 'weight, heavy'. Tchen-teru is 'the place of weight or heaviness' and is identified by the Egyptians with the Sirius system! I also discovered that Tchent is a two-headed god (later this name became one of the seventy-five names of Ra and lost its original importance). Now a two-headed god with each head representing one orbit and having fifty eyes, gives us a hundred-eyed god, and the hundred-eyed monster of the Greeks was Argus.

Wallis Budge says another form of *tchen-teru*, 'weight, heavy', is *teru*, which also means 'weight, heavy'. And the very next word in the giant dictionary is *teru* which means 'dwarf'. We thus see an apparent variation of the same word meaning 'heavy' and 'dwarf', and this word is specifically applied to the Sirius system.

But just in case there are any sceptics left (and there always are), a look at the Egyptian word *shenut* will be helpful. This word means 'the divine court of Osiris'. The same word

*shenit* means 'circle, circuit', and *shent* means 'a circuiting, a going round, revolution'. *Shennu* means 'circuit, circle, periphery, circumference, orbit, revolution', and there is a specific expression written



which Wallis Budge gives, and which means 'the two circuits' and of course twice fifty is a hundred, giving us the Great Year. *Shen ur* means 'the Great Circle' or 'the circuit of the Great Circle' or 'the islands of Shen-ur', which last is interesting in that it indicates that this place of the Great



Figure 45 Left the Egyptian symbol *shen*, right the cartouche sign inside which it became habitual to write the name of the Pharaoh and other proper names. As E. A. Wallis Budge says in *Egyptian Magic* (Routledge & Kegan Paul, London, 1899/1972, pp. 61-2): '[*Shen*] is intended to represent the sun's orbit, and it became the symbol for an undefined period of time, i.e. eternity, it was laid upon the body of the dead with the view of giving to it life which should endure as long as the sun revolved in its orbit in the heavens. In the picture of the mummy chamber the goddesses Isis and Nephthys are seen kneeling and resting their hands on *shen*. The cartouche has been supposed to be nothing more than *shen* elongated. The cartouche is an ellipsoid shape, and I believe that this 'stretched' or 'elongated' *shen* is specifically meant to represent an *elliptical* orbit. The fact that the sisters Isis and Nephthys, representing Sirius and her 'dark companion' have their hands placed upon *shen*, and the reason why *shen* is often represented as double, is in reference to the binary star system at Sirius. And the fact that there was an elliptical form of *shen* which became the receptacle for names is in reference to the esoteric knowledge that heavenly orbits are really elliptical and not circular, as specifically stated by the Dogon tribe.



Circ.e is not only 'the divine court of Osiris', who is the husband of Sothis (Sirius), but is also a place with islands (stars or planets) where one can presumably live. It does seem that the Egyptians had quite as clear a conception of the Sirius system as the Dogon have.

The verb *shenu* means 'to go round, to encircle', but the verb *shen* means 'to hover over' and presumably the great orbit is above us in the sky, hovering over us in space.

The Egyptian word *khemui* means 'hot parching winds, the khamāsin, or khamṣin, i.e. winds of the 'fifty' hot days'. This is rather interesting. Arabic *khamṣin*, 'fifty' and Hebrew *khamṣin*, 'fifty', are obviously derived from this Egyptian source. In late times 'the dog days' about the time of the rising of Sirius and called 'dog days' from 'the Dog Star' were supposed to be hot and scorching. There are many references to this in writers like Pliny and Virgil. Here is an earlier tradition of hot days incorporating the Syrian number *fifty*. This same word *khemui* has familiar meanings in its related forms. *Khemui-urtu* means 'the stars that rest not'. *Khemui-hepu* means 'a class of stars'. *Khemui-hemu* also means 'a class of stars'. In short, *khemui* means 'stars'. So *khem* (though apparently not used on its own in surviving texts) really means 'star', as well as referring to fifty days. *Khem* also has the meanings 'shrine, holy of holies, sanctuary', and 'little, small', also 'he whose name is unknown, i.e. God', also 'god of procreation and generative power', also 'to be hot', and 'unknown'. All these meanings are relevant to the Sirius mysteries. The Sirius system was held to be the source of generative and procreative power as we have already seen, Sirius B was of course 'unknown', and was 'little, small', and was a star that rests not. And which star rests not unless it be Sirius B? For only the planets, which were well known and differentiated by the ancient Egyptians, 'rested not' with the remarkable exception of Sirius B. Comets and meteors apart, and they too were well classed to themselves.

## THE SIRIUS MYSTERY

There is a 'Hymn to Osiris' preserved on a stela in the Bibliothèque Nationale, Paris, which dates from the XVIIIth Dynasty around 1500 BC., and which we find in Wallis Budge. We find *khem* used in this interesting hymn in the following passage<sup>9</sup>



ankhem.  
The stars which never diminish



cherast  
are under  
the throne

hrai  
of his face.



ast  
his thrones



pu  
are



ankhem  
the stars which never rest

This passage is extremely interesting because of the recurrent theme of 'thrones' (which word as a proper noun is the singular is the name of Isis) as applied to the celestial region of Osiris which, as we know, is the Sirius system. Of course, in the superficial view this passage may seem merely to describe some vague kind of reference to a great god who is in the sky somewhere or other, and has a heavenly throne and has a lot of stars twinkling here and there around him for added glamour. But a close inspection of the way things are said here won't let that kind of interpretation stand up. The fact is that the Egyptians were incredibly precise in what they said. One cannot just gloss over inconvenient precise statements which seem unintelligible and tempt one to brush them aside in order to 'get on with it'. In the above passage describing the *khem* or stars, we find them associated with, indeed identified with – thrones, which are quite separate from the throne of Osiris himself. Now, this is precisely equivalent to the description of the throne of Anu and the thrones of the Anunnaki which surround it, as we meet in

Sumer. And here too the context is both celestial and related to Sirius. And here too the thrones are 'stars which never rest

which could be a description of the movement of Sirius B. with the familiar meaning of each year's 'step' in the orbit equated with a throne'. The same word, *khemut*, however, refers to fifty days, and to Sirius.

There is another Egyptian word which can shed some light on our subject. A possible explanation of serpent's teeth and their springing up as soldiers may result from a pun on the Egyptian word *men*. This word means both 'soldier' and 'to plough, to till the earth, to cultivate'. A combination of the two meanings yields the strange idea of soldiers resulting from ploughing. And in the Jason story, Jason has to yoke the bulls and plough the field – only after which can he sow the serpent's teeth. Anyone who has read the *Argonautica* will know this. Jason didn't just walk into some field, throw some serpent's teeth about like birdseed, stand back and presto! He had to plough the field. He had to practise *men* in order to produce *men*.

Now we must turn our attention to the mysterious Egyptian word *tchām*. A general meaning of *tchām* is 'sceptre', possibly because the meaning of *tchām en Anpu* is the name of 'the magical sceptre of Anpu (Anubis)'.

*Tchām* are 'bowmen' and Sirius is the Bow Star, as we know. Now, the really intriguing meaning of *tchām* is 'a kind of precious metal'. There are various expressions in the literature such as 'the finest *tchām*', 'real *tchām*', and *tchām* from the hill-top'. The impression one gets is that this *tchām* is a pretty special commodity. Presumably Anubis's sceptre, which is the *tchām* sceptre, is made of this *tchām* material. A sceptre is an object which exercises rule and force. The fact that there is '*tchām* from the hill-top' could either have a mundane meaning to the effect that the stuff is a metal mined in the hills or more likely is connected with Anubis, not only through his sceptre, but through the hilltop as the residence

of the god in the ziggurat sense such as one finds in Sumer. For Anubis was known as 'Anubis of the hil.'

In Wallis Budge we find more information from Pyramid Texts about *tcham*.<sup>10</sup> The references are entirely stellar. There is a description of the deceased Pharaoh, in this case Pepi I. Pepi's father is Tem 'the great god of An (Heliopolis) and the first living Man-god, the creator of heaven and earth'. In Sumer too the great god of An was the creator of heaven and earth, but there was not, as far as we know, a city named after him as was the Egyptian city of An which came to be known to the Greeks as Heliopolis.

Of Pepi we read in the text that 'the appearance of this god in heaven, which is like unto the appearance of Tem in heaven'. This is all gross flattery—typical for the texts mourning the dead Pharaohs. Every Pharaoh looks like the great god of An and every other great god and does every conceivable celestial thing. The Pharaoh is dead, long live the Pharaoh!

Now various gods, including the Governor of the Land of the Bow and Sept (Sirius) 'under his trees', carry a ladder for Pepi. Pepi then 'appeareth on the two thighs of Isis, Pepi repositeth on the two thighs of Nephthys'. Tem puts Pepi at the head of all the gods, and 'Pepi setteth out in his boat', with Horus. He then stands 'among the imperishable stars, which stand up on their *tcham* sceptres, and support themselves on their staves'. This seems to make clear that the metal *tcham* is also a specifically stellar material which supports the stars!\*

Then we read<sup>1</sup> 'Th's Pepi liveth life more than your sceptres *au*'. The word *au au* means 'dog, jackal', and I suspect a connection with dog star and Anubis who is jackal/dog. Also the *au-ten-âthen* is the *au-t* of the sun, or 'the course of the sun'. But, to resume

\* The Greeks had a tradition of 'the strongest metal' and called it *adamant*. Kronos used it to castrate Ouranos (Uranus): mythically it was the strongest metal.

## THE RISING OF 'SERPENT'S TOOTH'

O ye gods of the Sky, ye imperishable ones, who sail over the Land of Tehenu [the Tehennu are 'the sparkling gods, the stellar luminaries' from *tehen* which means 'to sparkle, to scintillate'] in your boats, and direct them with your sceptres, this Pepi directeth his boat with you by means of the *uas* sceptre. Uasar is a variant form of Asar, the name of Osiris, and *uas t* is 'a kind of animal, dog (?)' <sup>2</sup>] and the *t.hām* sceptre, and he is fourth with you [indicating that he joins a group of three stars!] O ye gods of heaven, ye imperishable ones, who sail over the Land of Tabennu, who transport yourselves by means of your sceptres, this Pepi transporteth himself with you by means of the *uas* and *t.hām* and he is the fourth with you.

This Pepi is the *anes* matter which cometh forth from Nephthys. . . Pepi is a star. . . Pepi is Sept, under his *sebt* trees. . . The star Septet (Sothis) graspeth the hand of Pepi. Pepi plougheth the earth. . . Osiris [Pepi is addressed by the name], thou art the double of all the gods [U as is also the Egyptian name of Thebes.]

Here we see the dead Pharaoh Pepi's celestial after-death experiences described. He goes to the stellar regions and joins three stars, becoming 'the fourth'. He uses three sceptres for power, the *au* (similar to a word for dog/jackal), the *uas* (also the name of Thebes, similar to another word for dog, and related to a variant form of the name of Osiris), and the *ichām* (a mysterious metal and the sceptre of the dog/jackal-headed god Anubis). The star Sirius is specifically described as taking his hand. Pepi himself is transformed into a star, as clearly stated 'Pepi is a star'. He becomes a star and his hand is taken by the star SIRIUS, which can only mean that he becomes a star in the Sirius system, and he 'becomes fourth with them'. He then is identified in turn with the three other stars of the Sirius system, which are Isis-Sothis, Nephthys, and Osiris. The first emits '*anes* matter', the second is the

female Nephthys, which may be identical with the 'female Sorgho' or Sirius C of the Dogon (though sometimes Nephthys refers to Sirius B in other contexts), and the third is called 'the double of all the gods' – being the circling companion and the archetypal 'double' of many figures from Isis to Gilgamesh. This is quite obviously Sirius B.

And there is *tchân*, the mysterious, potent stellar 'metal' which is said to be the power of Anubis, whom we have earlier identified as the personification of the orbit of Sirius B. And *tcham* is quite similar to the word we dealt with earlier, *tchens*, meaning 'weight' and its related forms *tens* 'heavy, weight', *tensmen* 'to be heavy' and the similar word *teng* 'dwarf'. If we spoke of something described only by a series of these apparently related words, namely *tchens tens teng tcham*, the meaning would be, quite literally, allowing for the absence of proper grammar, 'the weight (of) heavy dwarf star metal', remembering that *tcham* is also specifically identified as the power of the god Anubis whom we have identified previously as the orbit of Sirius B, the dwarf star composed of super-heavy 'star metal'.

Concerning this star-metal, it is as well to take notice that in 'Isis and Osiris' (376 B), Plutarch says of the Egyptians: 'Moreover, they call the lodestone the bone of Horus, and iron the bone of Typhon, as Manetho records' (Manetho fragment 77). Recall that 'the bones of Earth in ancient tradition are stones. It is interesting that a heavy metal is 'the bone' of Typhon which we have earlier determined as a description of Sirius B. And magnetized iron or lodestone is 'the bone' of Horus, the son of Isis and Osiris. This is exactly the sort of tradition one would expect.

We must recall that Anubis is our form of writing the actual Egyptian word *Anp* or *Anpu*. The verb *anp* means 'to wrap around', obviously connected with Anubis's role as sacred embalmer. It is significant that *Anp hen* is 'a jackal-headed god who guarded the river of fire, a form of Anubis'.

## THE RISING OF 'SERPENT'S TOOTH'

We have already postulated that 'the river of fire' may be a way of describing the orbit of the star Sirius B, so it is quite interesting to see that Anubis, whom we have already identified as representing the orbit, is specifically said to be the guardian of the same river of fire. And 'wrap around' could have an orbital meaning as well as its obvious meaning of 'swathe'.

We recall that a special description of *tcham* given in Wallis Budge's *Dictionary*<sup>4</sup> was '*tchām* from the hill-top'. Also we have just equated *tcham* with Anubis. So it should not surprise us that a title of Anubis is *Tepi tu-f* 'he who is on his hill'. As I mentioned a moment ago, this seems to be a ziggurat-concept such as one finds in Mesopotamia. The *tepi* complex of words is quite interesting and bears examination.

*Tepi* means 'the foremost point of the bow of the ship, the hindmost part of the stern' – extremely specific and exactly fitting my specification of what was important about the ship *Argo*. *Tepi* also means 'the first day of a period of time', and I maintained earlier that the tip of the prow and the tip of the stern of *Argo* (with fifty oar-places between them) was a symbol of the orbit of Sirius B. Also we will recall that *āraq* means 'the last day of a period of time'. So any period of time has a first day called *tepi* and a last day called *araq* in Egyptian. And *tepi* describes the *Argo* just as *āraq* is the origin of the very word *Argo*. And *Tepi* is part of a *cracia* – descriptive title of Anubis whom I have equated with the *Argo*. There is even a further connection between *tepi* and the Sirius-complex. The words *tep ra* means 'the base of a triangle' and the words *septa* and *septuh* both mean 'triangle'. *Septu* is Sirius and the triangle is its hieroglyph.

The basic meaning of *tep* is 'mouth' (hence the meaning *tep ra sebek* '“crocodile's mouth” – a disease of the eye') and even more fundamentally 'beginning or commencement of anything'. It is interesting for the study of concepts of geometry to note that the Egyptians thought of the base of a triangle as its 'mouth' or beginning.

Now, the link-up which takes place between *argi* and *tepi* — that is, the end of a cycle and the beginning of the next — could lead to some confusion without much trouble. If the last day of the old cycle is the *argi* and the first day of the new cycle is the *tepi*, it would be easy to begin to think of the *argi* as the beginning — after all, it and the *tepi* are adjoining each other and amount to practically the same thing. In a sense one could say that the true end of a cycle is the beginning of the next. For us, New Year's Day is represented by a combination of an old man with a sickle or scythe walking away and a baby, representing the New Year. The two figures are together. Similarly, the *argi* and the *tepi* are inescapable companions. As time passed and traditions decayed a bit, it must have been an easy thing to think of *argi* as the actual beginning of a new cycle, since it was the end of the old. And it is this which I presume happened in Greek, for the verb *archomai* means 'one must begin' or 'one must make a beginning'. And it is related to *arche*, which means 'beginning, starting-point', etc., and which survives in our *architecture* and *archetype*. So here is further evidence that the 'ark' words in the Indo-European languages derived from the Egyptian *arg* words.

Another link of the 'ark' words complex with the Argonaut story is found in a strange place. One of the most peculiar of all treatises to survive from ancient times is the curious *Of the Names of Rivers and Mountains and of such Things as are to be found therein*.<sup>15</sup> This treatise survived in the corpus of Plutarch's writings but is obviously not by him. Plutarch lived in the first century A.D., but this treatise seems a little later than that. In fact, the treatise strikes me as basically a wild satire on a type of writing which was then common. One of the rivers discussed in this treatise is the Phasis, up which Jason sailed to Aea in Colchis. Of this river we read 'It was formerly called Arcturus.' Without elaborating on this point, I merely wish to note that the very



river at Colchis once may have had a name which may be related to the 'ark' word complex. Arcturus supposedly means 'bear-ward', referring to the ward of the bear known to us as Ursa Major, the Big Dipper. Arcturus in the constellation of Boötes is conceived of as its companion according to Allen, who says it had connections with Osiris and possibly Horus. This is probably another of the many confusions arising from 'companions' who are compared to each other. But as I said, I do not wish to be led astray by elaborating on the question of the name Arcturus and all that that would involve. I merely note the fact that the Phasis was once the Arcturus and leave it at that.

The name Phasis had connections with birds, such as with an expression 'the Phasian bird'. Recall the *kyrke* or Circe connections with Colchis. It is interesting then to note that the *phassa* in Greek is 'the ringdove'. Forms of this word refer to doves and doves are, as we have seen previously, intimately associated with omphalos-oracle centres marked out from Behdet. And we know that Aea in Colchis, which is on the River Phasis and has such associations with the *Argo* and the oracles, is related to doves in this way and also because of the doves let fly from the arks and *Argo*. So the fact that *Phasis* and *phassa* are connected is no surprise. This river, whether named Phasis or Arcturus, seems to be aptly designated. It is also to be noted that in Greek a *phasso-phonos* or 'dove-killer' is the name of a kind of hawk. And *kyrke* is likewise!

Before leaving Plutarch behind, we might note also that in 'Isis and Osiris', he tells us that a name for Osiris was *Omphix*. An interesting tie-in with the oracles, attested by Plutarch as current in Egypt in his day.

To return to *tepi*, we note that *tepi ra* means not only 'the base of a triangle' but 'divine oracle' which is also quite relevant. I have postulated that the oracles are connected with the *Argo* as representative of the orbit of Sirius B, the

beginning of which I designate by *tepi*, and we discover that the name in Egyptian for 'oracle' is *tep ra*

*Tepi ā* became the word for 'ancestors', due to the connection of *tepi* with the *beginnings* of things. And the *tepi-aw qerr-en-pet* were 'the ancestor-gods of the circle of the sky', which is again significant. Visitors, perhaps?

Gods of the circle in the sky seem to be referred to by Plutarch's account of the Persian religion in *Isis and Osiris*\* (370 A-B). The Persian religion prior to Islam was Zoroastrianism, which survives today as the religion of the Parsees of Bombay in India, to which city they fled from their Persian homeland when it was being conquered by the Moslem invaders. The Persians are not Semitic Arabs but are Indo-European, with a language and original religion closely related to the Aryan Indians and to Sanskrit. In fact, the earliest form of Sanskrit, which is called Vedic, is very little different from the earliest form of Persian, which is called Avestan.

Zoroaster\* (also known as Zarathusthra) is known to have postulated two basic divine principles: Ahura Mazda the principle of light and goodness, and Ahriman the principle of evil and darkness. These two principles are also known by the names of Ormazdes and Ahrimanus, which are the names used for them in Plutarch's treatise. If we recall Plutarch's description, cited by us earlier, that Anubis was the circle dividing the light from the dark in Egyptian religion, it will be interesting to note that in 369 E-F he equates with this concept, by describing it in similar terms, the Persian god Mithras who mediates between the darkness and the light. Then in 370 we find this remarkable passage: '(The Persians) also tell many fabulous stories about their gods, such, for

\* The prophet Zoroaster, who founded Zoroastrianism, the religion of Persia/Iran until the Mohammedan conquest, is of uncertain date, but certainly seems to have lived prior to 600 B.C.

## THE RISING OF 'SERPENT'S TOOTH'

example, as the following Oromazes, born from the purest light, and Areimanus, born from the darkness, are constantly at war with each other; and Oromazes created six gods, the first of Good Thought, the second of Truth, the third of Order and, of the rest, one of Wisdom, one of Wealth, and one the Artificer of Pleasure in what is Honourable. But Areimanus created rivals, as it were, equal to these in number 'These twelve gods would seem to be zodiacal. But it is the following passage, immediately after this, which becomes really interesting: 'Then Oromazes enlarged himself to thrice his former size, and removed himself as far distant from the Sun as the Sun is distant from the Earth, and adorned the heavens with stars. One star he set there before all others as a guardian and watchman, the Dog-star. Twenty-four other gods he created and placed in an egg. But those created by Areimanus, who were equal in number to the others, pierced through the egg and made their way inside; hence evils are now combined with good.' A footnote to the Loeb edition adds 'It is plain that the two sets of gods became intermingled, but whether the bad gods got in or the good gods got out is not clear from the text.'

This passage is really deserving of some attention. We find a quite specific description of all this taking place in a region meant to be distinct from our solar system. The Persians seem to have quite clearly understood the fixed stars to have been beyond the system of the sun. This, at least, is what they seem to be trying to convey – a distinction of locale. In any case, the 'light' god Oromazes and the 'dark' god Areimanus each create twenty-five gods, which gives fifty. And they are placed in an egg, which is an elliptical shape just as in an orbit. One of the twenty-five gods created by Oromazes is by a slight garbling said to be Sirius, but in any case, there were created by Oromazes the Dog Star Sirius plus twenty-four other gods which makes twenty-five and a corresponding twenty-five created by Areimanus – and they

mingle in the shape of an egg. What does that sound like? And Sirius is specifically stated to be the chief one. And as Arcimanius was the 'dark' god and his creations were 'dark', then his creation in opposition to Sirius would be a 'dark' Sirius, wouldn't it? And as for the fifty gods arrayed round Sirius (speaking strictly from this text one would have to say the forty-nine gods arrayed around Sirius, but I speak of garbling of the tradition because, from what we already know from other such descriptions from elsewhere, Sirius should really be the fifty-first element) they obviously represent the fifty years of the orbit of Sirius B in an egg shape around the Dog Star as its 'guardian and watchman'.

There are further examples of a wavering between forty-nine and fifty in the ancient traditions. Graves has these interesting remarks: 'Chief priestesses were chosen by a foot race (the origin of the Olympic Games), run at the end of the fifty months, or of forty-nine in alternate years.' Apart from the fact that Graves here speaks of 'the fifty months' as antecedent to the Olympiads, a point which we discussed much earlier, we see the alternative use of forty-nine and fifty as a quantitative time measurement. This is rather like the shilly-shallying between forty-nine and fifty in the above Persian description. There is also this example from the Bible, in Leviticus 25, 8-13:

You shall count seven sabbaths of years, that is seven times seven years, forty-nine years, and in the seventh month on the tenth day of the month, on the Day of Atonement, you shall send the rams' horn round. You shall send it through all your land to sound a blast, and so you shall hallow the fiftieth year and proclaim liberation in the land for all its inhabitants. You shall make this your year of jubilee. Every man of you shall return to his patrimony, every man to his family. The fiftieth year shall be your jubilee. You shall not sow, and you shall not

harvest the self-sown crop, nor shall you gather in the grapes from the unpruned vines, because it is a jubilee, to be kept holy by you. You shall eat the produce direct from the land.

The above words and many which follow them, but which I will not quote (as anyone can refer to the Bible for the full account), were spoken by God to Moses on Mount Sinai, and are Jehovah's directions as to what the Israelites must do. It is even more significant that Jehovah is made to say much later in the same speech, all of which has been devoted to his talk of his fifty-year jubilee and what must be done about it by the Israelites: '... for it is to me that the Israelites are slaves, my slaves whom I brought out of Egypt. I am the Lord your God.' Remember that Egypt as the source of the Sirius tradition had had 'brought out' of it the Sirius mysteries and traditions by Danaos to Argos, etc. It seems the Israelites too are part of this, though there will probably not be a single rabbi unshaken by such a suggestion.

A lengthy appendix, 'The SIRIUS MYSTERY: Questions for Judaism', has had to be omitted from this edition (as it was from the original edition) because of lack of space, and has thus never been published. I was able to find some fascinating material in the Kabala, and I had much to say about the Hebrew Jubilee of fifty years.

What, then, of the forty-nine versus the fifty? Perhaps for explanation we should return to Robert Aitken's book *The Binary Stars*.<sup>17</sup> In discussing the length of time of the orbit of Sirius B around Sirius A he says: 'Thus, Volet's orbit, computed in 1931, which differs very little from my own, published in 1918, has the revolution period 49.94, whereas Auwers gave 49.42 years – the point being that the orbit of Sirius B takes between forty-nine and fifty years and is somewhat less than fifty.'

The Aitken book also firmly informs us that the orbit is

an ellipse, as are the orbits of all heavenly bodies. But of course, when speaking generally of the orbit of Sirius B one does not say 'the ellipse', one says 'the circle'. We say in common parlance: 'The planets circle round the sun,' even though we know their orbits are elliptical. And most mentions of the orbit of Sirius B in our sources are to 'the circle'. But, naturally, the Dogon draw a specific ellipse in the sand to represent the orbit of Digitaria (Sirius B). Figure 8 clearly compares the Dogon tribal diagram of the orbit of Sirius B around Sirius A with a modern astronomical diagram of the same.

We have already seen near the beginning of the book how the Dogon not only know that the orbit of Sirius B around Sirius A is an ellipse, but they also know the astounding principle of elliptical orbits whereby that body around which the orbit takes place inevitably tends to be at one of the two foci of the ellipse. For the Dogon specifically say 'Sirius is one of the centres of the orbit of a tiny star Digitaria'. Kepler first formulated this principle as a law of planetary motion—a revolutionary step forward in Western science. The Dogon also describe the orbit of the 'Star of Women' (a planet around Sirius C) as forming an ellipse with Sirius C at one of the centres.

Now, in light of the dithering over forty-nine and fifty just referred to, and the references to seven times seven equals forty-nine, seen in the light of the fact that the orbital period of Sirius B is between forty-nine and fifty years, which can be well accommodated as Graves says of the Sacred Year, 'fifty months, or of forty-nine in alternate years', thereby balancing out to a close approximation to reality by alternating the count successively as fifty years, then forty-nine years, then fifty years—etc., one can understand why the orbit of Sirius B around Sirius A is 'counted twice to be a hundred years', as the Dogon say and as was done in Egypt and in Greece, and which led to the double-Sacred Year of one

## THE RISING OF 'SERPENT'S TOOTH'

hundred and the Greek goddess Hekate which means 'one hundred', and the hundred-handed ones of Greek mythology, etc. It was because orbits of Sirius B had to be counted in pairs in order better to approximate a whole number. And the fact that this was the case among the Dogon and the people of the Mediterranean area seems to confirm beyond all doubt that the Sirius tradition of the Dogon is a survival of the Mediterranean (namely, Egyptian) tradition brought by the ancestors of the Dogon from the Garamantes Kingdom of Libya where it had been taken by the Minyan immigrants.

It is also significant and conclusive that the Dogon specifically say 'The period of the orbiting of Digtaria is about fifty years and corresponds with the first seven reigns of seven years each of the first seven chiefs . . .' And 'This rule was in operation for forty-nine years for the first seven chiefs who thus nourished the star and enabled the star to periodically renew the world. But, the eighth chief having discovered the star . . .', etc., combining also the sacrifice of the sacred chief concept emphasized over and over by Graves in his many references to the Sacred Year of fifty months. This passage from Griaule's account of what the Dogon told him almost reads like a straight quotation from the Book of Leviticus in the Bible. Or from *The Greek Myths* by Graves! Can there be any further doubt that the two traditions are identical? That the Dogon brought it from the Mediterranean world into an obscure wilderness area where it has survived the ravages of time and empire amazingly intact and specific? And that the Mediterranean tradition in turn really was about Sirius and the orbit of Sirius B, the *great invisible*?

The Dogon tribe are really the last of the Argonauts, from whom they are quite literally descended—being Minyans in the middle of West Africa.

Turning to the Egyptian word *henti*, one finds that it is a name for Osiris and it also is 'a crocodile-headed god in the Tuat', which is the Egyptian underworld, and it also means simply 'crocodile gods'.

*Hent* is specifically 'the crocodile of Set' *hen-t* is, interestingly, a specific locality of the underworld and means 'a district in the Tuat'. But, more widely, *hen-t* is a mythological locality' which is not necessarily in the underworld. It would seem that the fabulous *Hent* was a locality which had an underworld counterpart and obviously is somehow connected closely with both Osiris and crocodiles.

The name of this region, *Hent*, when taken as a common noun rather than as a name, means 'dual'. This is a strong clue as to the nature of the fabulous region. A region intimately connected with Osiris and whose name means 'dual' is reminiscent of Plutarch's description of that circle or ellipse with its dual aspect of separating the light from the darkness. Lest the reader think this far-fetched I must hasten to add a further meaning of *hen-t* which is 'border, boundary', and another which is 'the two ends of heaven' which all appear to refer to a circle and have the *hen-t* ('dual') nature of outside and inside and the two extremes connected by a diameter. *Hent* also means 'end, limit' and a *henti* is a specific period of time lasting for 120 years. Remember that the *Sigui* of the Dogon was every sixty years and two Dogon *Sigui* make one Egyptian *henti*. In fact, a *hen-t henti* would be a *Sigui* or, perhaps, vice versa, depending upon one's grammatical preference. (The use of the word 'dual' can be rather ambiguous and be construed as either halving or doubling by the context.) And this dual time period is also rather like the two fifty month periods which make the hundred-month period of that sacred Great Year connected with Sirius, which has a dual aspect.

*Henti* also has the meaning 'endless' and the endless circling of Sirius B around Sirius A could be referred to here.



Some such idea must be at work, otherwise how can the same word have the meaning of 'endless' and also of '120 years'? It must be a reference to an 'endless' cycling of perhaps the orbit of Sirius B or of the Signi cycle's own basis. In any case, it signifies that the 120-year period was arrived at as an endlessly recurring cycle, and for that to have been the case, the 120-year period must have been quite important, which is exactly what one would anticipate. In Appendix IV there is an explanation proposed for the true nature of the Signi and of the *heni* based on certain astronomical facts.

Considering that *heni* means all this and also means 'crocodile gods', etc., it is surprising to see that *hen* means 'to plough' and a *hennti* is 'a ploughman'. One immediately thinks of Jason *ploughing* the field for the Dragon's (crocodile's?) teeth. It may well be that the 'serpent's teeth' motif which was a pun for 'the goddess Sirius' was extended in another layer of pun to 'dragon's teeth' as a reference to crocodiles.

In connection with Sirius B being the hairy bestial Enkidu figure, we see with interest that *hen* means 'to behave in a beast-like manner' and a *hennti* is also specifically 'a beast-like person'. In addition to *hennti* being a name for Osiris, who is the companion of Sirius, we find it describing 'a beast-like person' who is the archetypal companion in Sirius-related legends. And additionally, we find Hathor the cow-goddess, a form of Isis-Sirius, referred to as Henu-Neferit. (Neferit simply means 'beautiful'.) But this word *hennu* with the double 'n' has the basic meaning of 'phallus' and has a phallic determinative hieroglyph, and therefore may not be related to the *hen* words with a single 'n'.

*Hen-ta* significantly means 'grain' in keeping with the Dogon concept of Sirius B being a grain. *Henu* means the hawk-god Seker and his *henu* boat. This boat (echoes of celestial *Argo*) is the sacred boat of Seker, the Death-god of Memphis. This reminds us of the Circe-complex and the

death-god of Colchis. It must be emphasized that the hawk and the falcon are constantly being confused with each other not only in Egyptian studies, but I have asked falconers the difference between a hawk and a falcon and they vaguely suggest a difference in colour of eyes and that the falcon tends to be smallish. A hawk supposedly has golden eyes (solar?) whereas the falcon has brown eyes. But their habits are not identical and as there are various species of both hawk and falcon, confusion reigns supreme. The hawk and falcon do not seem to have been distinguished by the ancient peoples, or at least less so than the crocus and the colchicum (or 'meadow saffron'). Of course the differences were recognized in practice, but what we must realize is that in the ancient world the Aristotelian structure of genus and species for plants and animals did not obtain, and differentiation in linguistic or semantic terms did not resolve to so fine a focus. For such precision one would employ qualifying adjectives, but a systematic modern biological terminology did not exist. Hence we found much earlier that *kirke* in Greek meant 'a hawk or falcon'. In short, they are as interchangeable at the level of terminology as the 'l' and the 'r' were interchangeable in Egyptian at the level of pronunciation and symbol. It seems the Egyptians, like the Chinese of the present day with their 'fired lice' for 'fried rice' had a paralipsis and inability to differentiate the two liquid sounds. Indeed, the 'l' could be differentiated further if our ears were so trained. It is possible to pronounce a much more lingual and less dental 'l' than we use in English. But as for the French 'r', I confess to being as unable to form my tongue to pronounce that sound as Aristotle was, for instance, unable to pronounce the Greek 'rho'—this being considered by the Greeks to be a lisp.<sup>18</sup>

However, I have let myself digress. The subject of hawks and falcons can, it seems, be pursued to a resolution. Seton Gordon, probably the world's expert on the golden eagle, could not tell me a conclusive differentiation between them.

Nor could an experienced falconer friend. I was becoming impatient at this lack of an answer until I learned from my friend Robin Baring, who had once considered becoming an ornithologist, that an extremely subtle difference between the hawk and the falcon does actually exist. According to him, on a hawk, the fourth or fifth pinnon feather is longer making a rounded wing, whereas on a falcon, the second or third wing feather is longest making a pointed wing. I am not certain whether this is fully comprehensive to all the many species. In *A Glossary of Greek Birds*,<sup>19</sup> D'Arcy Thompson says that the ancient Greek poet Callimachus (who was quite a scholarly gent) claimed there were ten species of hawks, and Aristotle claimed Egyptian ones were smaller than Greek ones. It looks as if people have been trying to sort out hawks and falcons since the Creation. But if the reader is as weary of these birds as the author, let us agree to drop them and face the last few remaining Egyptian words. We have survived a waterfall, can we muster the strength to pull ourselves to shore?

*Hensekhi* means 'hairy one' and also Isis and Nephthys. Nephthys could be identified with Sirius B who is the archetypal 'hairy one', but it seems more likely that Nephthys varied between being a name of Sirius B and being a name of Sirius C, the female star which was also invisible. The *hennemut* are, tantalizingly, 'men and women of a bygone age'. The meaning 'to plough' of *henn* and 'boundary' of *hent* are linked through 'arable land' of *hent* in the word *hen-b* which means 'to delimit, to measure land, to make a frontier boundary' (This seems to connect the single 'n' words with the double 'n' words after all.) Thus, further possibilities for punning between a reference to the delimiting orbit of Sirius B and 'ploughing' in connection with the ploughing of the ground for the sowing of the serpent's teeth—serpent's teeth being a pun on the goddess Sirius, as we know. Hence a series of dizzying puns all interlocking.

Just for final measure we note that *Hen-b* is also a serpent god of the Tjat and *Henb-Requ* is a jackal god, bringing us into Jason with the jackal/dog Anubis and Sirius B's orbit and adding as a final flourish yet another pan on serpent.

We recall that the throne and the oar were the two most common allusions to the yearly 'steps' in the fifty-year orbit of Sirius B. Also the name of the goddess Isis (in Greek, *Isios* in Ionian), which in Egyptian is *Ast*, means 'throne', and is represented by the hieroglyph of a throne. Significantly, then, *as-ti* using the same hieroglyph of the throne, means 'one in the place of another, successor'. This is a specific reference to the sequentiality of the thrones. And the orbit which they represent, also known as Anubis, seems to be given specific recognition by the combined form *Ast Anpu*, which is Isis-Anubis.

Another name for Isis as Sirius specifically is *Aakhu t*. This is also the name given to the Great Pyramid. In the light of this new name it is not surprising to learn that *Aakhuti* is 'the god who dwelleth in the horizon'. And *aakhu-t sheta-t* means 'the secret horizon'. *Aakhuti* are 'the two spirits, i.e. Isis and Nephthys'. And the *aakhu-t* are also 'the uraei\* on the royal crown', etc. demonstrating the origin of the most central of the Pharaonic insigniae. Hence yet further demonstration of the connection of the Sirius system with 'the secret horizon' of Sirius B's orbit and its profound importance to the Egyptians.

Another form of the name of Isis, *Ast*, is *Aas-t*, which is seen as significant if we note that *aasten* means 'one of the eight ape-gods of the company of Thoth. He presided over the seven . . .'. For this is a parallel to the Sirius-linked story of the Dogon, whereby the eighth chief presided over the previous seven chiefs as a means of signifying the orbital period of Sirius B commencing again with the advent of the

\* Uraei were symbolic serpents heads issuing from the pharaoh's own head.

eighth chief following the seven chiefs, each with a reign of seven years giving seven times seven or forty nine years. This Sirius concept is here referred to in another form of the very name in Egyptian for Isis, who was identified with Sirius.

Another way of referring to Isis and to Nephthys is as Aār-ti, 'the two Uraei-goddesses, Isis and Nephthys'. There is an intimately related form of this word, Aārārut, which probably is the origin of the Sumerian goddess Aruru's name. For she was the counterpart of Isis in Sumer (and was known also as Ninhursag, Nintu, Ninmah, etc.). It is specifically in her name of Aruru that she creates the hairy Enkidu, companion to Gilgamesh. No doubt because Enkidu is related to Sirius B, she appears in this name in the *Epic of Gilgamesh* because this particular name is closely related to the Sirius lore, through its derivation from this Egyptian form. Aar-ti is a common name of both Isis and Nephthys, and Nephthys is more closely connected with the companion of Sirius. The appellation Aruru is thus closer to Sirius B, who is also represented by Enkidu, than another name for the goddess Sirius which was not specifically shared with Nephthys, the dark companion. This word also means 'uraei' and we have just seen that the other word for the *uraei* is related to the horizon of Sirius B's orbit, as well as also being shared with Isis and Nephthys—obviously shared because the orbit described by one is described *around* the other, and as we have seen several times, the orbit was common to them both and divided their respective precincts. Therefore words connected with this orbit must be common to them both. And what more appropriate name for the Sumerians to use for the goddess in her role as creator of Enkidu, the dark companion of Gilgamesh, than a name derived from this aspect of the goddess?

Sirius the Dog Star is represented by the hieroglyph of a tooth, so it is important also to know that there is a word in Egyptian which means both 'tooth' and 'dog'. I am referring

to *shuār*, 'tooth', and *sha* 'a kind of dog', *sha-t* 'female dog', *shas* 'a dog-god', and *Shaa-t* which is a form of Hathor who is identified with Isis.

A so *sha-t* means 'one hundred', and is the Egyptian synonym for the Greek Hekate

Another word for 'tooth' is *abeh*, and a related form of the same word means 'acka'. In addition *aba* means 'to make strong', and *ab-t* means 'path'. *App* means 'to traverse', and *ap* means 'steps'. If I may be forgiven lack of grammar, *app-ab-t-em-ap* means 'to traverse a path in steps', which is exactly what Sirius B does in its orbit. Since Anubis has been identified as the orbit of Sirius B, it is not surprising that a title of Anubis was 'the counter of hearts' with 'the counter' being the word *api* and *abu* meaning 'hearts'. But if we altered that slightly to *api-abt* instead of *api-abu*, the meaning would be 'the counter of months', for *abt* means 'month'. Another pun with a deeper meaning with reference to the 'hundred months (or years) counted' by Anubis, who is the orbit, as he traverses his *ab-t-em-ap*, his 'path in steps'.

To go on examining the Egyptian language would be superfluous to our present intentions. So would a continued elucidation of Sumerian religious names from Egyptian. But it would be just as well to fill in a bit of information on that transition which brought our Mediterranean Sirius tradition south from Libya to the Niger River. Herodotus told us how the Garamantes of Libya had been pushed further and further westwards and southwards. Graves says they were forced down to the Fezzan in the desert regions of south Libya. We find a further account in *A History of West Africa* by J. D. Fage:<sup>28</sup>

Herodotus, writing about 450 B.C., speaks of the Garamantes, that is the people of the oasis of Djerma in the Fezzan (who in modern terms would be accounted Tuareg), raiding the 'Ethiopians', i.e. black-skinned peoples, across the Sahara in two-wheeled chariots each

drawn by four horses. About 400 years later, another great early geographer Strabo, says much the same of the Pharusii of the western Sahara, who may perhaps be equated with ancestors of the Sanhaja. The chariots of the Garamantes and Pharusii were very light fighting vehicles, unsuitable for carrying trade goods, but it is a point of considerable interest that Herodotus's and Strabo's accounts of their activities have been confirmed and given added point by the discovery on rocks in the Sahara of some hundreds of crude drawings or engravings of two-wheeled vehicles each drawn by four horses. The most significant aspect of these drawings is that they are almost all distributed along only two routes across the Sahara, a western one from southern Morocco towards the Upper Niger, and a central one running from the Fezzan to the eastern side of the Niger bend.

In *The White Goddess*, Robert Graves says also of the Garamantes.<sup>7</sup>

Herodotus was right in stating on the authority of the Egyptian priests that the black dove and oracular oak cults of Zeus at Ammon in the Libyan desert and of Zeus at Dodona were coeval. Professor Flinders Petrie postulates a sacred league between Libya and the Greek mainland well back into the third millennium B.C. The Ammon oak was in the care of the tribe of Garamantes: the Greeks knew of their ancestor Garamas as 'the first of men'. The Zeus of Ammon was a sort of Hercules with a ram's head akin to ram-headed Osiris, and to Amen-Ra, the ram-headed Sun-god of Egyptian Thebes from where Herodotus says that the black doves flew to Ammon and Dodona.

In his fascinating book *Lost Worlds of Africa*,<sup>22</sup> James Wellard in Book Three, 'The People of the Chariots', discussed the Garamantes and related topics at some length. One of the most amazing elements in the story concerns an apparently lost civilization sitting under the sands of the Sahara which once was the centre of the Garamanian empire, and which was dispersed by the Moslem Arab invaders. Wellard describes this civilization in suitably mysterious terms:

On the track which runs across the desert from Sebha, the modern capital of the Fezzan, to the oasis of Ghat on the Algerian border, the traveller crosses an underground water system that has few parallels for ingenuity and effort in African history. Seen from inside, the main tunnels are at least ten feet high and twelve feet wide and have been hacked out of the limestone rock by rough tools, with no attempt to smooth the surface of the roof and walls.

How many of them actually remain is still not certain, though hundreds of them are still visible. In places they ran less than twenty feet apart and their average length, from the cliffs where they originate to the oases where they terminate, is three miles. If we assume from the 230 that remain visible that there may have been as many as 300 of them in this region of the desert, we have, taking into account the lateral shafts, nearly 1,000 miles of tunnels hewn out of the rock under the desert floor.

We are still not clear as to how the system worked. First, where is the entrance to these tunnels? One can spend hours trying to find their inlet, and though the solution would seem easy at first, assuming that a particular mound is followed along its entire length, the investigator finally arrives at a jumble of rocks at the base of the escarpment without being able to tell where the tunnel has disappeared to. (the system possibly) presupposes an adequate and regular rainfall, in which case



we have to go back as far as 3000 B.C. to find such a maritime climate in the Sahara Desert. Could the *foggaras* be that old? Wells are the only water sources in the Wadi el Ajal today, and they are adequate for the present population of some 7,000 people. If we compare this figure with the 100,000 or more graves so far found in the Wadi and dating from the time of the 'people of the water tunnels', we can get some idea of how populous this region was. In addition, the construction of such an enormous hydraulic complex indicates an industrious and technologically advanced people who had reached a stage of culture superior to that of northern Europe before the Roman conquest.

We can, therefore, safely assume that (a) between 5000 and 1000 B.C. a cattle-raising and agricultural people belonging to the Negro race had occupied large areas of the Sahara Desert which they kept habitable and fertile by means of the *foggaras*, and (b) it was precisely the prosperity of these defenceless Africans that incited the white settlers along the Libyan coast to invade the Fezzan. These immigrants (originally, it seems, having come to Africa from Asia Minor) were the Garamantes, the people of the four-horse chariots first mentioned by Herodotus, who describes them as already a very great nation in his time. They thereupon appear and disappear throughout the classical period until, around A.D. 700, they vanish altogether as the last of their kings was led away to captivity by the Arab invaders of the Fezzan. Their Saharan empire had lasted over a thousand years.

Yet we know almost next to nothing about the Garamantes, and the reason is obvious: with the fall of the Roman Empire, Africa became a 'lost continent', so much so that no European traveller reached even as far south as the Fezzan until the beginning of the nineteenth century.

I should add that it was the Emperor Justinian (reigned 527-565 AD) who destroyed North African civilization, before the Moslems came.

Wellard also says that in the Garamanian territory are myriads of tombs, pyramids, fortresses, and abandoned cities lying untouched by any archaeologist's spade. For instance, he visited the fortress city of Sharaba which lies out there in the desert gradually sinking beneath the sand. In the first place, perhaps not more than a few score European travellers have visited the site in any case, as it lies off the caravan routes in one of the more inaccessible pockets of the Mourzouk Sand Sea. In point of fact, archaeological research in the country of the Fezzan has only just begun.

After the Arab conquest of the Garamanian empire, the survivors fled south-west and fused with the Negro aboriginals on the south bank of the Upper Niger, and adopted their language', as Graves tells us in *The Greek Myths*,<sup>23</sup> and as he learned from the books of the anthropologist Eva Meyrowitz.<sup>24</sup>

So here is some more light on how the Dogon and related Negro tribes of the Upper Niger came to possess their amazing information. It is a tale of thousands of years, and the drama was enacted across thousands of miles, which only seems suitable considering the nature of the message they were to carry into a much different world – the global village of late twentieth-century culture. According to the Dogon, 'the shaper of the world' visited the earth and returned to the Sirius system, having given men culture. Now that our race has set foot on another heavenly body and we are looking outward to our solar system, we are prepared to give serious consideration to any neighbours who might be within a few light years of us and have solar systems of their own which they inhabit and where they pursue their lives with the same desire to know, to learn, to understand, and above all to build.

## THE RISING OF 'SERPENT'S TOOTH'

a genuine ethical civilization, that motivates the best of us. For if they are not so motivated it is doubtful that they will have survived their own technologies. In love one can live, but without love there is no world that will not poison itself. One must assume that any creatures living at Sirius will have come to terms with a wholesome and vital ethic. If Sirius is indeed the home of a 'shaper of the world', then it may encourage us, too, to become shapers of worlds.

### Notes

Griaule and Dieterlen: *Le Renard pâle* (op. cit.), p. 44. 'The establishment of categories, of classifications, of correspondences, constitutes an armature comparable to the framework of a construction, to the articulated bone structure of a body. What imparts life to them gives them their own physiology... for the Dogon, their relationship with God and with the order in the world he created, that is to say with the way the universe was organized and functions today.

'It is the myth that lights up the whole. Structures appear progressively in time and are superimposed, each one with its own special meaning, also with its own interrelations which are narrowly connected. That is what lends meaning to the succession of categories and stages of classification, which give evidence of the relationships established between man and what is not of man in the universe.'

For a more complete account of how the armature of symbolic interrelationships extends even to the smallest daily action or object for the Dogon, one should read the entire section 'The Thought of the Dogon' (pp. 40-50), in *Le Renard pâle*. This section expresses quite well the mentality required to function within a society grounded in reality at a level. The one drawback to such patterns of thought is that they can ossify if over-elaborated as a baroque maze, and stultify free inquiry, as happened in the Middle Ages in Europe when the church had the answer to anything, and anyone who disagreed could go fetch his rope and stake, make a bonfire, and commit himself to his divinity. There are dangers to anything: no system of thinking is perfect. Only the constant unrelenting exercise of a free will and attention can regulate that most ill-regulated of organisms, the human personality, and keep it on course. Systems are paracetals, whether of thought or society, and all equally useless to the non-vigilant individual. The doctrine of the mean expressed in all sound philosophy is the doctrine of exercise of the attention at all times, the

## THE SIRIUS MYSTERY

high wire performer is the archetype of the successful man.

2. Wallis Budge, Sir E. A., *Osiris and the Egyptian Resurrection*. 2 vols., London, 1911, Vol. II, pp. 294-7.
3. *Ibid.*, Vol. I, p. 156.
4. *Ibid.*, Vol. I, pp. 389-90.
5. Plutarch, op. cit. The essays in the volume discussed in my Appendix V.
6. *Ibid.* Vol. I, pp. 106-7.
7. *Osiris*, op. cit. Vol. I, p. 93.
8. *Ibid.*
9. *Gods of the Egyptians*, op. cit., Vol. II, p. 164.
10. *Osiris*, op. cit. Vol. II, p. 3.
11. *Ibid.*, Vol. II, p. 341.
12. See Wallis Budge, Sir E. A., *An Egyptian Hieroglyphic Dictionary*, London, 1920.
13. See Note 6.
14. See Note 12.
15. In Vol. V of Goodwin's translation (ed.) of Plutarch's *Morals*, 1874, op. cit.
16. *Greek Myths*, op. cit., 60.3.
17. *The Binary Stars*, p. 238.
18. What is so odd about the Chinese inability to distinguish the two liquids is that they have both of them more or less in their own languages. For the 'l' is extremely common and a sound rather close to an 'r' is also commonly used.
19. Op. cit, p. 65 under *Isis*.
20. Fage, J. D. *A History of West Africa*, Cambridge University Press, 1969, pp. 14-16.
21. Op. cit, p. 182 (Chapter Ten under 'D for Dair').
22. Weiland, James. *Lost Worlds of Africa*, Hutchinson, London, 1967; also reprinted by The Travel Book Club, London, 1967.
23. Op. cit., 33.
24. See Notes 13 and 14 to previous chapter.

## SUMMARY

In ancient Egyptian, the hieroglyph and word for 'goddess' also means 'serpent'. The hieroglyph for Sirius also means 'tooth'. Hence 'serpent's tooth' is a pun on 'the goddess Sirius'. In the *Argo* story Jason sowed the serpent's teeth, an idea which must originally have stemmed from this

## THE RISING OF 'SERPENT'S TOOTH'

**Egyptian pun** The Greek word for 'the rising of a star' also refers to 'the growing of teeth from the gum'. Therefore when the serpent's teeth were sown in the ground, they grew up from it as from a gum – that is, the star Sirius (serpent's tooth) rose over the horizon.

Thus we see the mythological code language of sacred puns in operation. Behind the myths lay concealed meanings which are decipherable by returning to the hieroglyphics and finding synonyms which form puns.

We find explanations of the words Argo, Ark, Argos, etc., by looking for Egyptian origins. These words derive from the Egyptian word *arg*. But related words in Greek give clues as well. Argus was a dog connected with a cycle. Another Argus had one hundred eyes and watched over Io, who is connected with the Sirius traditions and Isis. The Egyptian word *argt* refers to an end of a cycle, represented in the *Odyssey* by Argus. The Egyptian word *arg* refers to a circular concept and is the origin of the Latin *arcere* and of our arc.

A temple of Isis found in southern Italy has in its inner sanctum a painting of hundred-eyed Argus (portrayed, however, with a normal face and eyes). The mysteries of Isis were celebrated in this inner sanctum. Also the fifty daughters of Danaos traditionally brought from Egypt to Greece (and hence southern Italy) the mysteries of the Thesmophoria which according to Plutarch were Isis mysteries. So we see Isis connected intimately at the most secret and sacred levels with 'fifty' and 'one hundred' (Hekate) and Isis was identified with Sirius.

The earliest Egyptians believed Sirius was the home of departed souls, which the Dogon also believe. The Egyptians said that when a deceased spirit 'went to Nephthys' he revolved 'in the horizon' and 'revolves like the sun'. This is a pretty specific description of the dark Nephthys as a 'sun revolving around Sirius'.

The Egyptians also maintained that emanations from the

region of Sirius vivified creatures on Earth. This, too, is believed by the Dogon.

Since the Egyptians believed Sirius was the other world of departed souls, it is interesting that they called 'the other world' *arg-kehut*, using the familiar word *arg* again.

In Egyptian the region of Sirius is described by a word meaning also 'throne' and 'weight' and similar to a word meaning 'dwarf'.

The Egyptian word meaning 'fifty' (from which are derived the Arabic and Hebrew words meaning 'fifty') referred to the fifty hot 'Dog Days' of Sirius and also to a star that rests not - obviously a moving star, namely Sirius B with its fifty-year orbit.

Sirius in Egypt is 'the Bow Star'. The Egyptian word for 'bowman' refers also to a heavy star metal connected with Anubis (which we have previously suggested refers to the orbit of Sirius B, which is, after all, made of 'heavy star metal'). The word for heavy star metal is similar to the words for 'dwarf' and 'weight'.

The Egyptian word for 'the beginning of a cycle' (which would join up with *arg* meaning 'the end of a cycle') means also 'oracle' and 'the front and hind tips of a ship' - a vindication of my oracle-*Argo*. The same word also means 'the base of a triangle' (and the word for 'triangle' is a variation of the name for Sirius, whose hieroglyph is a triangle). We also have geodetic triangles, connected with the ark, from Thebes and Behdet.

Plutarch gives an account of a Persian description of the Dog Star Sirius, which is said to be surrounded by fifty gods forming the shape of an egg (elliptical orbit) in which the 'light god' faces the 'dark god'.

In the Biblical Book of Leviticus, God commands the Hebrews to observe a jubilee every fifty years, but I have never heard of their doing so. Obviously the Hebrews did not understand the fifty-year orbit of Sirius B which Moses (who

## THE RISING OF 'SERPENT'S TOOTH'

was an initiate of Egypt and 'raised by Pharoah') presumably had in mind.

In Egyptian the word for 'the secret horizon' also means 'the two spirits' namely, the light Isis and the dark Nephthys. The same word also means 'the god who dwelleth in the horizon' and 'Isis as Sirius'. The secret horizon would seem to refer to the orbit of Sirius B in which Sirius B lives.

The Egyptian word for 'dog' also means 'tooth' (the triangle hieroglyph meaning 'Sirius' and 'tooth'), and also means specifically 'dog-god' and also 'one hundred'

Another Egyptian word meaning 'tooth' means 'to traverse a path in steps' and 'to make strong', and is used in connection with Anubis in such a way that could be 'the counter of months while traversing the path'. A synonym means 'one hundred' and 'Sirius'. We thus have 'counting one hundred months while traversing the Sirius path'. But Anubis who does this is 'a circle'. So we have 'counting one hundred months while traversing the circular Sirius path'. Change months to years (as Moses might have done?) and we have two fifty-year orbital periods of Sirius B.

We see that the ancient Egyptians had the same Sirius tradition which we have encountered from the Dogon tribe in Mali. We know that the Dogon are cultural, and probably also physical, descendants of Lemnian Greeks who claimed descent 'from the Argonauts' went to Libya, migrated westwards as Garamantians (who were described by Herodotus), were driven south, and after many, many centuries reached the River Niger in Mali and intermarried with local Negroes.

The Dogon preserve as their most sacred mystery tradition one which was brought from pre-dynastic Egypt by 'Danaos' to the Greeks who took it to Libya and thence eventually to Mali, and which concerns 'the Sirius mystery'. We have thus traced back to pre-dynastic Egypt well before 3000 BC the extraordinary knowledge of the system of the

## THE SIRIUS MYSTERY

stars Sirius A, Sirius B, and the now-confirmed 'Sirius C' possessed by the Dogon

We have thus managed to rephrase, if not to answer, the Sirius question. It is no longer 'How did the Dogon know these things?' It is now 'How did the pre-dynastic Egyptians before 3200 BC or their (unknown) predecessors know these things?'

What is the answer to the Sirius question? We do not know. But knowing the right questions is essential to an eventual understanding of anything. The many investigations which should properly follow upon the asking of the Sirius question may give us more answers than we could at present imagine. *Added 1997* The investigations I called for in the 1970s have still not happened and whatever attempts I made to raise funding for them failed utterly – as recently, in fact, as 1997.

Archaeologists have a difficult task trying to explain the many similarities between Sumer and Egypt, indicating some still undiscovered common origin for the two cultures – an entirely forgotten civilization whose remains must exist somewhere.

But in considering the very origins of the elements of what we can call human civilization on this planet, we should now take fully into account the possibility that primitive Stone Age men were handed civilization on a platter by visiting extraterrestrial beings, who left traces behind them for us to decipher. These traces concerned detailed information about the system of the star Sirius which is only intelligible to a society as technologically advanced as ours today. Today was the time when we were meant to discover these coded facts, I feel sure. Today is the time we should prepare ourselves to face the inevitable reality that extraterrestrial civilizations exist, and are in all probability far more advanced in culture than we ourselves – not to mention in technology which could enable them to travel between the stars!



## THE RISING OF 'SERPENT'S TOOTH'

It may be difficult for us to avoid seriously entertaining that most disturbing and also exciting of notions: that intelligent beings from elsewhere in the galaxy have already visited Earth, already know of our existence, may possibly be monitoring us at this moment with a robot probe somewhere in our solar system, and may have the intention of returning in person some day to see how the civilization they established is really getting on.

*Added 1997:* Alternatively, they may never have left our solar system, as I have explained in the introductory chapter to this new edition. As some form of suspended animation would be necessary for any interstellar voyage, and as their work was only half done, it is more likely that they re-entered suspended animation for a few thousand years and are preparing to re-appear from, perhaps, some base in the outer solar system. It is highly likely that our planet is currently under intensive observation by monitors too small and sophisticated for us to detect. We should really be preparing for a renewal of contact, not wasting our time insisting that it can't happen. There is nothing really strange about an extraterrestrial contact except to naive folk like us — for we are mere children in the cosmic hierarchy.



PART THREE

*Beyond the Mystery*



## CHAPTER NINE

# A Fable

Once there was a little girl sitting by the seashore. Her mother had told her to go and play. She watched the waves and thought 'If only something marvellous would happen to me today.' The sun was shining very hot upon the sand and the girl became drowsy. The sound of the quiet surf was like a lullaby. She began to doze.

Suddenly she awoke. The air was alive with a new coolness, a haze had lifted, everything was startlingly clear to the sight. Far out, she glimpsed a flash in the sea, then another flash, a glint of something in the sun. There it was again—something coming towards the shore and making its way through the waves. It must be a porpoise. The girl was terribly excited. Something was happening to make her day memorable. Now she would not have to sit by the seashore and be bored.

Now that the porpoise was getting nearer, it alarmed the girl. Could it be about to crash against the sand, as she had heard giant whales did from time to time in despair? Was it a dolphin actually intent on self-destruction? The girl ran hurriedly towards the spot which seemed to be the dolphin's objective. She saw its tail fin, quite close, appear for a moment. Some seaweed it seemed to be trailing with it showed through the water. It was a bright, almost shiny,

porpoise . . . it was now near the sand . . . what would it do? She could see it now, through the water. It stopped. It seemed to be grovelling in the sand. Its tail splashed up, then down. It remained stationary.

The poor dolphin had crashed into the sand. Full of pity, the girl began to wade out towards it. But it moved away slightly. It wasn't stuck in the sand. It was looking up at her from under the water. What could it be trying to do? The girl went back to the shore. The fish now moved in closer again. From quite near to the fish, a woman put her head above the water. She had silver make-up on her face and eyes that went up. The little girl was worried about the fish. 'Have you got hold of the dolphin?' she asked the woman. Just beneath the woman's shoulders there was a noise like a swimming suit strap snapping against her skin. She replied to the girl with a fixed stare and a high wail which seemed to be a song. She moved towards the girl, her eyes never straying from her. Her eyes were clear blue, like the sky. It was as if there were two holes in her head and you could see the sky through them. Again her swimming suit strap snapped against her. Her eyes were like the hot sun. The girl wanted to go to sleep. The woman's eyes were like the sound of the surf. The girl sat down in the sand and tried to make herself see the woman more clearly. The woman's face appeared to be really silver.

The woman's chest showed above the water now. Her bosom was bare. Her swimming suit strap must have snapped. The woman's bosom was a beautiful silvery green and shiny in the sun. The woman seemed unable to go any farther. She stared at the girl and remained motionless, except for a slight swaying to and fro.

'Who are you?' asked the girl. 'Have you come from a boat?' The woman gave a long wail, but the expression on her face did not change. Then there was the snapping of the swimsuit again. But this time the girl saw that above the woman's bosom were two long thin suits, which had opened

and snapped shut loudly as if they were muscles flexing, just under her beautiful sleek collar-bones. The woman stirred as if she were resting uncomfortably on a high stool. She looked dissatisfied and, twisting her torso, she leapt forward and fell with a splash in the surf near where the girl sat. She had no legs. It was what the girl had thought was the dolphin. The woman was a mermaid. Her body stretched out long, sleek, shiny in the sun, with the surf rushing up past her and then retreating. She leaned on an elbow and raised her dolphin's tail slightly in the air, then tapped the shallow water, and did so several times in the way that the girl herself tapped her fingers on her desk at school sometimes.

The mermaid had no scales like an ordinary fish. Her skin was like that of the dolphins in the aquarium who jumped through hoops. But she was more silvery and more green. And there was a kind of hair streaming down her back like thin seaweed, which looked brown, or silver, or green, or grey, or even black. It was all those colours. And still the mermaid tapped her tail against the surf and stared at the girl. She was very much like a naked woman. She looked like the girl's mother did when she hurried to put on her dressing-gown before a bath.

Once again there was the snapping noise, only quieter. The girl saw the long thin slits in the woman's chest open and close instantly. Then the woman made a low, pleasant humming sound and looked sleepy. She leaned forward and an amazing series of clicks and pops were apparently made by her in her throat, which the girl could see constricting and moving.

The girl stood up and said to her, 'I've never seen a mermaid before. Can I tell Mummy?' The mermaid seemed to reply by smacking a fin against her skin somewhere behind her, rocking, and making a long, loud hum. She leaned forward more and looked at the girl and her eyes seemed to gloss over and go green. She opened her mouth, little pointed

teeth showed in pink gums, and a long whispering sound came out which sounded like the sea at a distance. She then beckoned the girl to her with her arm, and her webbed fingers.

The girl stood in the surf and touched the mermaid. 'You're so soft,' said the girl, 'not like fish are. I mean fish are soft, but you're so smooth.' The girl liked the mermaid. She had never seen anyone so smooth and silvery and beautiful. 'I bet you can swim better than ordinary people. I'm going to run and tell Mummy you're here!' The girl began to walk away. 'You won't go away, will you? Wait here.' And she made every effort to smile and signal her intentions. The woman seemed to nod in agreement. The girl ran quickly, looking back often to see if her mermaid woman would wait for her. The mermaid made no attempt to move, but merely watched the girl.

From a distance the mother could see something lying in the surf, as her daughter tugged at her skirts excitedly. 'It's something from a wreck,' said the mother.

'No, Mummy, it's a mermaid!' said the little girl.

'Don't be silly darling, mermaids don't really exist. They're just in stories. Now what is it you've found?'

Then suddenly the thing in the surf moved. It was horrible, like a serpent. 'Oh! It's alive! It's moving! No!' and she turned and tried to push her little girl back home. 'I'm going to get Daddy. He'll know what to do. It may be a creature which is injured. Now come with me.'

But the little girl eluded her and ran towards the sea. 'No, Mummy, it's a mermaid! Come and see!'

Feeling sick in the pit of her stomach and apprehensive, the mother followed her daughter and feebly called after her. The girl quickly reached her friend from the sea, and the mother, seeing her standing beside the moving creature, cried, 'No! Get away! Get away from it.' She then ran and it was a woman and fish, it was silver. It was a



mermaid! 'No, darling, no! Get away from it! It's horrible!' Her daughter came to her obediently and the mother stared in disgust and nausea at this awful slimy sea creature with a grotesque human frame grafted on to it – a monster, an abomination. She felt her stomach constrict, she gasped, she bent forward in the thought that she would be sick. 'God!' she gasped. 'Go home Go home!' and pushed her daughter violently to make her run.

'What is it, Mummy?' asked the girl, who was now becoming terrified. 'Mummy!' she cried in alarm. Her mother was choking, eyes bulging, stumbling towards her with her flat palm outstretched to push her away towards home. 'Mummy' Mummy. They heard a loud splash and turned just in time to see the mermaid slip away effortlessly, at lightning speed into the deep water – gone instantly from sight.

'Oh God!' said the mother, as she clasped her head and fell to her knees on the sand.

She's gone, Mummy. The mermaid's gone. But you saw her!

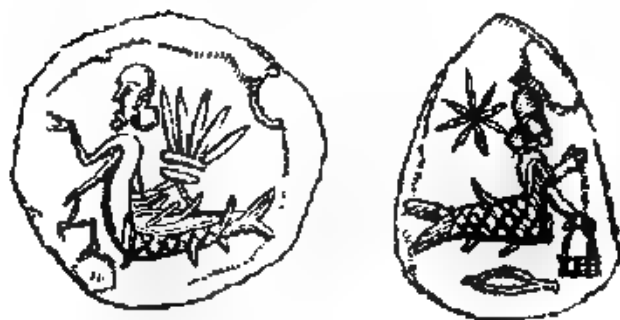
The mother looked at her daughter as if the girl might at any moment herself turn into a mermaid. 'Oh darling, what was it? Tell me it isn't true.' said the mother, and put her head down into the hot, sharp sand.

A little story about a child and an adult and their different reactions to a strange, intelligent amphibian. To the child 'it could swim better' and was silvery and fascinating. To the mother it was repulsive and horrible.

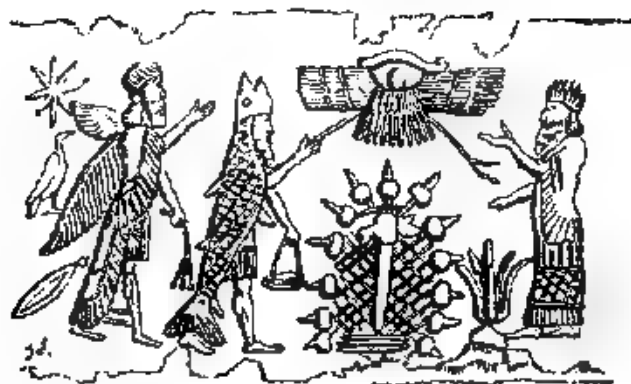
In Appendix III the reader will find in English translation the surviving fragments of the lost *Babylonian History* by Berossus. A priest of the god Bel, and alive in 290 BC, he wrote a history of Babylon in Greek. The Creation to the Flood comprised Book One; Book Two ended at 747 BC and Book Three ended with the death of Alexander the Great. He

seems to have been an acquaintance of Aristotle and drew on his own country's temple archives (which were in cuneiform, of course) to compile the history of his country from original documents. The readership would have been the cosmopolitan inhabitants of the Hellenistic world created by the conquests of Alexander.

In his work, Berossus describes his country's tradition of the origins of its civilization. And the tale is a strange one. For a group of alien amphibious beings were credited by the Babylonians with having founded their civilization. The main individual of the group of amphibians is called Oannes. We have had occasion to refer to him earlier. There are several illustrations of him throughout this book (final colour plate, Plates 34-37 and Figures 46 and 47). In somewhat later traditions than the ones Berossus drew on, Oannes became the fish-god of the Philistines known as Dagon and familiar to many readers of the Bible. By that time Oannes, as Dagon, had become an agricultural deity. In the surviving fragments of Berossus we have no reference to the Philistine tradition,



*Figure 46. Fish-tailed Oannes on gems in the British Museum. The representation on the right shows a star and eye of Osiris — an Egyptian hieroglyph on a Babylonian gem.*



*Figure 47* Fish-tailed Oannes from Assyrian cylinder seal. He stands before an omphalos stone covered in geodetic mesh with descending octaves on either side of it. The eye-star is above and a 'mouth of Nommo' is to lower left.

and we shall probably never know whether Berossus mentioned it or not. But in the Berossus fragments preserved by the historian Apollodorus, we read that there appeared another personage from the Erythraean sea like the former having the same complicated form between a fish and a man, whose name was Odacon. This seems fairly clearly to be a corrupted form of 'Dagon'. Unless 'Dagon' is a corrupted form of 'Odacon'. The 'Erythraean sea' is that body of water known to the ancients which we today subdivide into the Red Sea, the Persian Gulf, and the Indian Ocean.

Apollodorus criticizes Abydenus (late fourth century B.C., a disciple of Aristotle who wrote several historical works), for not mentioning that there were other amphibious beings besides Oannes himself. He says 'concerning these Abydenus has made no mention'. Apollodorus, therefore, seems to have given Berossus a close attention to detail which

Abydenus, for his purposes, neglected. This is an extremely important point, as we shall now see. Berossus, according to the close account of Apollodorus, calls the amphibians by the collective name of 'the Annedoti'. They are described as 'semi-daemons', not as gods. For some time I thought that 'the Annedoti' must be a convenient and tradition-sanctioned name for these creatures. I was concerned to have a name for them because, as we learn in a moment, the Dogon tribe claim that amphibious creatures with fishtails founded their civilization too, and that they came from the system of the star Sirius. If there are intelligent creatures living on a planet in the Sirius system it would seem from all evidence that they are amphibious, resembling a kind of cross between a man and a dolphin. It is therefore necessary to come up with some name for those creatures if we are to discuss them from time to time.

With this in mind, I suddenly wondered what the word 'Annedotus', which is never translated in the Cory translations of the fragments of Berossus, could actually mean. I read once again the fragment of Berossus from the careful Apollodorus and scrutinized the translation of it, which was: '... in whose time appeared the Musarus Oannes the Annedotus from the Erythraean sea.'

What was meant by the untranslated words 'Musarus' and 'Annedotus'? Strangely enough, until I purchased my own copy of Cory's *Antient Fragments*,<sup>2</sup> I had never before noticed that the words 'Musarus' and 'Annedotus' were untranslated. In libraries, with a pressure of time, one tends to overlook these details. I also had overlooked this in the account of Apollodorus quoted by Carl Sagan in his *Intelligent Life in the Universe*.<sup>3</sup> These are all reasons why I felt that I should include as an appendix to this book the complete surviving fragments of Berossus (excluding a couple unrelated to our concerns which may be found in the third and final, 1876 posthumous edition of Cory's book). For

unless all of the material is available and easy to hand, one invariably overlooks something and neglects to make the frequent and necessary comparisons which enable one gradually to read between the lines and obtain additional insights.

It so happens that the most frequently cited version of Berossus's account is usually that preserved by Alexander Polyhistor of Miletus.<sup>\*4</sup> But that is where problems can begin. For Alexander Polyhistor does not use the words '*annedotus*' or '*musarus*' in his account. And the version preserved by Abydenus uses the word '*annedotus*' only as if it were a proper name. ' . . . in his time a semi-dæmon† called Annedotus, very like to Oannes, came up a second time from the sea . . . ' As for the word '*musarus*', Abydenus does not use it at all.

So I turned to the lexicon to find the meanings of these words. I assumed that Cory would have translated them into English if they had simple and obvious meanings. But to my surprise I found that their meanings were quite simple and specific. A '*musarus*' is 'an abomination', and an '*annedotus*' is a 'repulsive one'.

Now the reader may appreciate why I wrote the little fable. For the creatures credited with founding civilization in the Middle East were frankly described by the Babylonians who revered them and built huge statues of them (Plate 34) as being 'repulsive abominations'. If ever anything argued the authenticity of their account, it was this Babylonian tradition that the amphibians to whom they owed everything were disgusting, horrible, and loathsome to look upon. A more

\* Born circa 105 B.C., he was taken as a prisoner of war to Rome where he spent the rest of his life and wrote many books.

† A dæmon in Ancient Greece was a semi-divine and helpful spirit; a semi-dæmon was not a spirit but an embodied being with supernatural or paranormal qualities.

normal course for any invented tradition of the origins of civilization would have been to glorify the splendid gods or heroes who founded it. But instead we find specific descriptions of 'animals endowed with reason' (Alexander Polyhistor's account) who make their awed and thankful beneficiaries want to be sick with revulsion. And what is more, the tradition admits this freely!

The problem of revulsion is a difficult one. It seems to be partly a result of what we are taught when young. No doubt psychologists would have a great deal more to say about it. But whatever origins it may have, it seems to be almost uncontrollable once a propensity to it has developed. If someone finds snakes or spiders repulsive, it would take a great deal of persuasion to get him to change his attitude and hypnosis is generally required to overcome a genuine phobia. As humans, we tend to dislike all slimy creatures, creepy crawling creatures, creatures which ooze or slither or wriggle. Indeed, people who have a pronounced fondness for such creatures often seem to be suffering from a pathological condition themselves. I once knew a girl who kept a pet boa-constrictor in her bedroom, next to her bed for 'company'. She fed it a live mouse every Thursday and she loved to watch the mouse being eaten alive. She loved more than anything to hear the snake at night in the dark when it made a curious sithering fall against the side of its tank, this excited her greatly. Sometimes she slept naked with the snake wrapped round her. [This last sentence or something like it was actually censored in my first edition, which shows how times have changed.] Now, I do not wish to criticize the girl for her strange tastes but I think most readers will agree that the girl had somehow transformed the interest in a snake into something else. And that kind of substitution is the promotion of a fantasy which can probably be classed as pathological, though possibly not dangerous to anyone (except the mice).

## A FABLE

Granted all these circumstances of human relationships to slithery creatures and the problem of revulsion in general, it does strike me as a most superb irony that a race of intelligent beings may really exist in our near neighbourhood of space who are slimy and repulsive, and yet who have founded many of the elements of our own human civilization and have a technology sufficiently advanced to enable them to travel between the stars. Indeed, when all other pleasures in life fail, the one remaining is a delight in irony. I recommend it, both to men and Annedori.

According to Berossus as preserved by Alexander Polyhistor, the amphibians look like this.

The whole body of the animal was like that of a fish, and had under a fish's head another head, and also feet below, similar to those of a man, subjoined to the fish's tail. His voice too, and language, was articulate and human, and a representation of him is preserved even to this day. . . . When the sun set, it was the custom of this Being to plunge again into the sea, and abide all night in the deep, for he was amphibious.

Who was Berossus, and how reliable was he? It is best to quote Cory's own preface for the information.

Berossus, a Babylonian, flourished in the reign of Alexander, and lived some time at Athens and according to many wrote his Chaldaean history in the Greek language. As a priest of Belus [Bel. or Baal] he possessed every advantage, which the records of the temple and the learning and traditions of the Chaldaeans could afford, and seems to have composed his work with a serious regard for truth. He has sketched his history of the earlier times from the representations on the walls of the temples: from written records and traditionary know-

ledge, he learned several points too well authenticated to be called into question, and correcting the one by the other has produced the strange history before us. . . The first book of the history opens naturally enough with a description of Babylonia. The second book appears to have comprehended the history of the ante-diluvian world, and in this the two first fragments ought to have been inserted.

As for two of those later writers who preserve fragments of Berossus, Abydenus the disciple of Aristotle wrote an *Assyrian History*, now lost, and Megasthenes wrote an *Indian History*, also lost. None of the four writers who have preserved Berossian fragments has had any of his own writings survive intact either. Later writers such as Eusebius, the Christian historian of the fourth century AD, and Syncellus, the ninth-century AD Byzantine historian, have preserved in turn all of the fragments of Berossus which the earlier writers had quoted in their own works. For it seems that the original of Berossus was lost long before the originals of Abydenus, Apollodorus, Megasthenes (an Ionian, circa 350–290 BC, who visited India and wrote a famous history, *Indika*, which is lost), and Alexander Polyhistor. And unless some obscure Byzantine monkish library or Egyptian papyrus of Hellenistic date or Babylonian tablet produces new fragments, we may never know more about Berossus than we do now at third hand. But at least my Appendix III should be a help. For it will be the first time since 1876 that the fragments of Berossus will have been published.<sup>5</sup>

Ptolemy has an interesting tale. 'Moreover, Eudoxus says that the Egyptians have a mythical tradition in regard to Zeus that, because his legs were grown together, he was not able to walk. . . . This sounds very like the amphibious Oannes of the Sumerians who had a tail for swimming instead of legs for walking.



## A FABLE

*Additional section added in 1997*

I did not know at the time I originally wrote this book that Greek mythology was full of amphibious fish-tailed beings with human bodies. I thought I was fairly familiar with Greek mythology, and indeed I was, but the Greek amphibious beings had escaped my attention or I had not realized their actual significance.

What is particularly surprising is that there are so many of them. One of the oldest is Nereus (see Plate 28), who had fifty daughters – the Nereids. It is believed by scholars that he was the original Greek sea god who was displaced by Poseidon (Neptune). He was one of the ‘Old Men of the Sea’. Hesiod (eighth century BC) says of him ‘And Sea begat Nereus, the eldest of his children, who is true and lies not and men call him the Old Man because he is trusty and gentle and does not forget the laws of righteousness, but thinks just and kindly thoughts.’<sup>7</sup> Another of the Old Men was Proteus. The ‘Old Men of the Sea’ were slippery characters who if you wrestled with them changed shape, as Hercules discovered. But they were immensely wise and knew just about everything, and could prophesy forthcoming events – if you could trick them into telling you what they knew, that is. They were quite keen on mermaids, being mermen, if you see what I mean. For they had fish tails and human bodies and could speak just like us. And they could throw their arms around a mermaid without the slightest difficulty.

Another very ancient amphibian was Cecrops (*Kekrops*). He was the founder of Athens, its first king, and he gave his name to its inhabitants, who called themselves Cecropidae before the goddess Athena came along, after which they called themselves Athenians after her. Cecrops is shown in Figure 48 with Athena, into whose care is being given the son of Cecrops, named Erichthonios. Both Cecrops and Erichthonios were fish-tailed and human-bodied (what is called ‘biform’). As time went on, with many of these figures,



*Figure 48* On the right is Cecrops, the fish tailed (becoming serpent-tailed) mythical founder and first king of Athens. The large woman reaching up from below is the goddess Gaia, 'Earth', who has just borne a son to Cecrops, a baby fish-tailed being called Erichthonios, who was later to become king as well. He is being given into the custody of the goddess Athena. Cecrops holds a sprig of olive to symbolize Athens and Attica. This is thought to be the oldest surviving illustration of the Birth of Erichthonios, which was later to become a favourite subject for Athenian vase painters. It was excavated from a grave at Ilissos and dates from the middle of the fifth century BC. Before they were called Athenians after the goddess Athena, the inhabitants of Athens called themselves Cecropians (*Kekropidae*).

the fish tails tended to become more and more like serpent tails. It was Cecrops who welcomed Athena to Athens in the first place, deciding in her favour in a dispute between her and Poseidon over which one was to be the patron god of Attica, the country of Athens. There was a tradition preserved by a scholiast on Aristophanes's play *Plutus* (113)

that Cecrops had come from Egypt. Diodorus Siculus (first century BC) also said the Egyptians claimed this.<sup>8</sup>

The fish-tailed or serpent-tailed son of Cecrops, as just mentioned, was Erichthonios. There was another form of his name, Erechtheus. Later the two names diverged and they were thought to be two separate personages. Anyone familiar with the Acropolis at Athens will know the Erechtheon, on which the philosopher Socrates worked as a stone mason. It is named after Erechtheus/Erichthonios. At one time the Acropolis had a strange salt spring, and it was said to have sprung up at the command of Poseidon: its name however was *Erechtheis thalassa*, and Poseidon was ritually invoked there by the name of Erechtheus!<sup>9</sup> Poseidon later killed Erechtheus, however (avenging the murder of his son, Eumolpus), so there is a very curious contradiction in this early mythology. The daughters of Erechtheus were the Hyades. Diodorus Siculus said that the Egyptians claimed that Erechtheus was an Egyptian who came to Athens and became king, and introduced the Eleusinian Mysteries to Greece from Egypt.<sup>10</sup> There are thus traditions that both Cecrops and his son, the two mythical amphibian or half-man/half-serpent monsters who were founders of Athens, were of Egyptian origin.

Then there was Scylla, well known from Homer's *Odyssey*. She was a fearsome fish-tailed character, and from her girdle issued a dog's head, or perhaps three dogs' heads, or sometimes even more, which made her more awesome (see Plate 29). Hesiod tells us that Scylla was the daughter of Hecate, who was the underworld counterpart of Sirius.<sup>1</sup> Doubtless that is why she had dogs issuing from her waist, as she represented the Dog Star, and her mother had Cerberus, the fifty-headed hound of hell, to keep her company, so dogs were in the family. The fact that Scylla had dogs' heads issuing from her waist, the point where her biform nature was transformed from fish to human, is a curious fact, and I know

of no mythologist who has ever explained it. So I offer a possible explanation. In his treatise on 'Isis and Osiris', Plutarch is discussing Anubis when he says:

When Nephthys gave birth to Anubis, Isis treated the child as if it were her own, for Nephthys is that which is beneath the Earth and invisible, Isis that which is above the earth and visible, and the circle which touches these, called the horizon, being common to both, has received the name Anubis, and is represented in form like a dog, for the dog can see with his eyes both by night and by day alike. And among the Egyptians Anubis is thought to possess this faculty, which is similar to that which Hecate is thought to possess among the Greeks, for Anubis is a deity of the lower world as well as a god of Olympus. <sup>2</sup>

This passage which I have discussed earlier, clearly indicates that Isis represents the visible component of Sirius (Sirius A) while Nephthys, Isis's sister, the 'dark goddess', represents the invisible component, Sirius B. As we have seen previously, 'the circle' is the orbit of Sirius B, called Anubis. Anubis was also called 'the horizon'. 'Horizon' in Egyptian is *aakhu-t*, and what has come to interest me more recently is that *aakhu-t* is also the name of the Great Pyramid. It would seem therefore that another name for Anubis was *Aakhut*, since it was used to mean 'the god who dwelleth in the horizon', and as we have seen from Plutarch, this is Anubis. (The Egyptians sometimes spoke of Horus-who-is-in-the-Horizon, but when they do that they tend to identify him. An explanation of the strange name Horus-in-the-Horizon is too complicated to give in a small space.) In my new first chapter to this book I have explained that I do not believe that the Great Sphinx was ever meant to represent a lion, as its body has no leonine characteristics whatever (no mane, no tufted tail, no raised haunches). I believe that the Sphinx was

intended to be a dog, not a lion — and that it was in fact originally a giant statue of Anubis. Either its head was originally that of Anubis and was recarved in the image of a megalomaniac pharaoh (it has often been suggested by archaeologists that the head has been recarved to represent the face of a pharaoh of later days) or the Anubis body may always have had a human head. But in any case, the lion-aspect of the Sphinx is a complete fantasy, and it astonishes me that everyone has gullibly accepted this bit of nonsense without question for so long! The body of the Sphinx has only been visible for about a century, and I wonder who originally said it was a lion. Once a mistaken notion like the Sphinx being a lion has got itself established, no one questions it. The Sphinx is really a dog, and Sirius is the Dog Star.

Under this hypothesis, then, the Giza Pyramid Complex was one where the central edifice, the *aakhu-t*, was guarded by *Aakhut*. What could be more appropriate?

But having seen Plutarch's remarks about Anubis' connection with the division between Isis and Nephthys, whereby he was the *middle*, we can see that this was symbolized in the case of Scylla. For a dog issues from her *middle*. In Egyptian tradition, Anubis divided one female form (Isis) from another (Nephthys), whereas by Greek times, the dog divided a single female form at her middle. So, just as we have seen that the amphibians Cecrops and Erichthonios were said to be of Egyptian origin, it would appear that Scylla probably is as well. But in her strange anatomy she embodied greater secrets, and these concerned the Sirius System.

There is another possible connection here. In Egyptian the word *mek* is the name for the Egyptian measure, the cubit, said by modern scholars to be 0.525 metre, or about 20 inches. It was also called the royal cubit and was under the protection of a large number of gods including Isis, Nephthys, and Osiris. But another name for the cubit was

*aakhu meht*, so perhaps part of the lore was a special connection between the cubit and the Great Pyramid (hardly surprising!) and also Anubis, who as an orbit was a measurer *par excellence*. And perhaps it should also be mentioned the *meht* is also Egyptian for 'fish' and that *mehusu* is Egyptian for 'the great flood that destroyed mankind'. Whether there was meant to be any connection between the royal cubit and the Great Flood, and fish or fish-men, is another subject well worth some thought. But we shall not pursue it further here. What we were particularly interested in was the unusual symbolism of Scylla's form, and its connections with the Sirius lore. She was certainly one of the strangest of the amphibians of antiquity.

Another famous Greek amphibian was Triton. In later times, he multiplied and they spoke of 'the tritons'. It was fun for the vase painters and sculptors to have lots of tritons gambolling about in the waves. It made for lovely rococo effects. But originally there was only one god Triton. Of course, he had a fishtail and the body of a man. He was another of the Old Men of the Sea. In fact, there were at least four more in addition to Nereus and Proteus who have already been mentioned. Glaucos, Phorcyx, Palaemon, and Nigaion were also Old Men of the Sea. So that makes at least eight of them.

The name of Triton is important. It was also the name of the Oracle Octave centre at Lake Triton in Libya, which was the birthplace of the goddess Athena in one version of her birth. It is interesting that the Aryans took with them to India the tradition of a water god called Trita, who appears in the earliest Sanskrit texts, the Vedas.<sup>12</sup> This indicates the extreme antiquity of the name and the god, as it must mean that Triton/Trita was exportable by about 1500 BC to an alien people, who took him with them when they marched very far from the sea indeed, across Central Asia to India at

about that time. Monier-Williams, who compiled the definitive Sanskrit dictionary, gives the Greek *tritas* as a cognate of the name *Trita*, so the relation between the names is accepted, and means 'third' <sup>14</sup> Trita was a rather mysterious figure. He fought against disruptive demons and was a keeper of the nectar of the gods. He was able to prepare the magical sacred beverage soma, which he also supplied to the gods. He was associated with the god Indra in the struggle against chaotic disorder, and was also friendly with the god Vayu, the god of the wind, and the Maruts, who were subsidiary wind deities. His other name was Aptva, 'water-deity', and he was supposed to reside in the remotest regions of the world. He could bestow long life and is said to have written part of the sacred scriptures personally. There is also a story about his being shut up in a well, <sup>15</sup> which might be an echo of the Sumerian Enki shut up in his Abzu (a watery chamber or 'abyss'). The fact that Triton's name means 'one third' is also very interesting from the point of view of Sumerian and Babylonian traditions, since the god Enki's (Ea's) name *Shanabi* literally means 'two thirds'. Gilgamesh was also described as being 'two-thirds god, one-third man'. Two-thirds and one-third were also part of the sacred computations regarding the orbit of the planet Mercury. And the mystical triangle symbolizing water to the Pythagoreans\* also had angles of two-thirds and one-third. I have described all of these matters at some length in the notes to my translation of the Epic of Gilgamesh, so shall not repeat them here <sup>16</sup> But it seems clear that the traditions of Triton/Trita preserve Sumero-Babylonian lore, and not only in that Triton is one of the Oannes-type culture-hero amphibians, or *anedots*.

\* The followers of Pythagoras in Classical Greece who studied sacred mathematics and musical theories, and had a secret philosophical society, several of Plato's students were Pythagorean sympathizers.

Hesiod's *Theogony* of the eighth century BC is the earliest text which actually mentions the name of Triton, who according to Hesiod 'owns the depths of the sea' and is a son of Poseidon.<sup>†</sup> Triton was well on his way to India by this time, having departed with the Aryans about 700 years before Hesiod. Daremberg and Saglio are convinced that Triton was 'originally an independent god', and assigning him to Poseidon as a son was done later: they also say

Anciently, one finds him established in two regions of the world peopled by the Greek Aeolians, and where the Aegean civilization has left profound traces: in Boeotia and in Crete [there is also a River Triton in Boeotia]

In Crete at Itanos, he figures on their coins. One could ask if this Cretan divinity isn't the dolphin god Delphinios, whose name became an epithet of Apollo, and of which the cult, originally of Knossos [in Crete], spread into the Mediterranean Basin and installed itself at Delphi, where it was transformed. Similarly, on the Libyan coast, where the citizens of Itanos contributed to the foundation of Cyrene, there was a River and a Lake Triton (today Farouin, or El-Loudeah) on the banks of which are located many cosmogonic\* legends. Here one cannot fail to recognize at least in the formation of the artistic type the influence of the fish-gods of the coast of Syria. Dagon, worshipped at Azoth, and at Gaza, under the form of a half-man, half-fish monster, Derceto, an analogous feminine divinity who had a temple at Askalon. It is even probable that the African Triton is a purely Libyan divinity assimilated by the Greeks as the very most characteristic of their marine gods. He played an important role in the legend of the Argonauts: he helped the heroes in their navigation, made them escape the

† Concerning the creation of the Cosmos



dangers of the Syrtes [Gulf of Syrte, shallow waters near Libya] and showed them future things. The inhabitants of Attica and Euboea, the towns of Corinth, of Byzantium, of Troezen, seem equally to have known Triton at an ancient epoch. Finally, one finds him represented on the coins of Karystos, of Cyzicus, a city opposite Byzantium [one is reproduced], of Nicodemus in Bithynia, of Agrigentum, and of Skyllition.<sup>8</sup>

Like Trita in India, Triton had associations with the Great Flood. Daremberg and Saglio tell us:

In the Gigantomachy \* one sees him at battle beside his father [Poseidon], 'and the terrible sound of his conch shell made the gods' adversaries flee. It is he who made the Flood waters recede while Zeus, appeased, yielded the Earth to the human race. It seems that Poseidon delegated to him a part of his powers. He could, to his liking, with the call of his conch raise up or calm the waves of the sea. He shook the rocks with his trident, and made islands spring up from the ocean's depths. Like the other marine gods, notably Nereus and Proteus, he possessed the gift of prophecy. He filled beside his father the same role which Hermes fulfilled beside Zeus: he carried messages from the god. he lent assistance to Theseus. he escorted Phrixos and Helle [in connection with the Golden Fleece], the Argonauts, and the Dioskourides. . . Above the hips, says Apollonius of Rhodes, his body was of a shape similar to that of the bodies of the blessed gods, but below his flanks on both sides, were aligned the two extremities of the tail of an enormous sea-monster. originally [this type of body] belonged to the Old Man of the Sea and Nereus and

\* The great battle between Typhon and Zeus.

Glaucos. As we have already said, Triton is an heir of the Old Man of the Sea, and it is he whom we must recognize in the representations of half-man, half-fish sea monster.

Nothing supports the supposition that he originates from a purely human form — but we have noted the influence of Oriental models on his artistic type. The god Dagon is often figured in the reliefs of the Palace of Sargon, on Babylonian cylinder seals, on Phoenician and Persian coins, on Greco-Phoenician scarabs, with forms similar to those of the Greek Triton.<sup>19</sup>

Another mythological figure of great importance whose body was half-human and whose bottom half was that of a dragon or great serpent was Typhon (see Zeus fighting him in Figure 49). Typhon shared with Scylla a very unpleasant temper. Daremberg and Saglio say of him:

One of the multiple forms under which the Phoenician Set continued to live in Greek mythology. One knows that in the Egyptian legend, Set, also called Typhon [which is the name Plutarch gives Set, for instance, when writing about Egyptian mythology in Greek], is the brother of Osiris. The latter personifies light; Set is, on the contrary, the demon of the storm and of gloom.

The Oriental origin of Typhon seems to be well demonstrated by these resemblances. Further, most of the writers, and already Homer, place the sojourn of Typhon in Cilicia [in Asia Minor]. . . . Pindar shows us Typhon, monster of a hundred heads. The artists have represented him [additionally] with wings to signify his furious leap towards the sky [as is illustrated in Figure 49]. The legs of the monster are replaced by serpents

[he was] in conflict with Zeus and in this combat the fire of the earth carried him straightaway up to the fire of

the sky . The noxious winds (*vente*) were, it was said, the children of Typhon and Echidna, 'the viper' [another biform creature, human above and serpent beneath, who lived in a cavern beneath the Earth and was extremely unpleasant, with horrid breath] One has in addition often seen in Typhon a demon of the Hurricane. From his union with Echidna, the monster had ill-omened descendants . . . [including] the Sphinx, the Harpies the Hound Orthros<sup>21</sup>

Here we see specific associations of Typhon with Sirius: he and his monstrous bride were the parents of the cosmic hound Orthrus, representing the Dog Star. And they were also the parents of the Sphinx, which, as I have said a moment ago, I believe was meant to represent the dog Anubis. And of course Typhon had either fifty or a hundred heads, the number of years constituting Anubis's Sirius B's orbit. Typhon and Echidna were also the parents of Cerberus, the fifty-headed hound of hell.

Hesiod's account of them in the eighth century BC makes hair-raising reading:

fierce Echidna who is half a nymph with glancing eyes and fair cheeks, and half again a huge snake, great and awful, with speckled skin, eating raw flesh beneath the secret parts of the holy earth. And there she has a cave deep down under a hollow rock far from the deathless gods and mortal men. There, then, did the gods appoint her a glorious house to dwell in, and she keeps guard in Arima [in Cilicia] beneath the earth, grim Echidna, a nymph who dies not nor grows old all her days.

Men say that Typhaon [Typhon] the terrible, outrageous and lawless, was joined in love to her, the maid with glancing eyes. So she conceived and brought forth fierce offspring; first she bore Orthrus the hound of



*Figure 49* Zeus, wielding a thunderbolt, is seen in battle against the ferocious Typhon—leader of the rebellion against his rule, and who was said to have had fifty heads (although only one is shown here). Typhon was the Greek version of the Egyptian god Set, who murdered and dismembered Osiris. In Greek tradition, Typhon was, like Cecrops, Erichthonios, Nereus, Triton, Scylla and others, a fish/serpent-tailed monster without legs. But unlike the others, he was a chief rebel against the order of heaven. Zeus pursued him at last to Mount Kasion, one of the sacred centres of the eastern oracle octave. From a Greek vase painting.

Geryones, and then again she bore a second, a monster not to be overcome and that may not be described, Cerberus who eats raw flesh, the brazen-voiced hound of Hades, fifty-headed, relentless and strong. And again she bore a third, the evil-minded Hydra of Lerna [who had a hundred heads]. Echidna was subject in love to Orthrus [her own son] and brought forth the deadly Sphinx.<sup>21</sup>

Here we may have a garbled reference to the relationship between Isis and her own son Horus, who succeeded his father Osiris in importance. The Greek Sphinx was also intimately connected to the story of Oedipus, who married his mother. I would suggest that the story of Oedipus, which

by classical times appears to concern human beings, has its origins in a more archaic mythological setting, perhaps that of Orthrus mating with his mother, Echidna. The Greek Sphinx is the common link between the two mother-son matings. And probably the ultimate origin of all of these tales derives from the Egyptian motif of Horus who succeeds his father Osiris as consort of his mother Isis – or at least that is how it may have appeared to the Greeks, who did not necessarily appreciate all the fine details of the Egyptian story and who may have taken a rather sensationalist, tabloid view of the situation of this son taking over his father's position like that and being just a bit too friendly with his mother.

And so, as we have seen, there was a huge cast of fish-tailed marine characters in Greek mythology derived from Oannes and Dagon, related to the Sirius tradition, often specifically said to have come from Egypt, and related to Isis, Anubis, and even the Sphinx.

In Plate 3., we see two truly remarkable effigies from Cyzicus, a city opposite Byzantium. These show the goddess Isis herself as a half-human, half-fish creature. And one of them shows her with her tail entwined with that of her husband Serapis (a later name for Osiris), who is also fish-tailed. These effigies are very late in date, being from the Greco-Roman period – that is, late centuries BC – early centuries AD. But it may be that by this time the secrets of Egyptian mysteries were coming out, having spread, as I believe that they did, into the pagan Gnostic sects and then into the Christian Gnostic sects as well. I believe that at this time the so-called Hermetic books were written up in Greek, drawing upon genuine ancient Egyptian texts in some cases, notably in the instance of 'The Virgin of the World' treatise which has already been discussed at length on p. 153. So the notion that Isis and Osiris had fish-tails may have been a dark secret in Egypt, only to emerge when the mystery traditions

were dispersed after the collapse of Egypt as an independent nation. Plutarch gives a hint of this when he says in his treatise 'Isis and Osiris' that the Egyptians maintained that the Elder Horus had been 'born a cripple';<sup>22</sup> this seems like a reference to the fact that he could not walk because he had no proper legs. (In Greece, the limp of the god Hephaestus may have been of similar origin.) From this period the worship of Isis became widely spread as a minority cult throughout Greece, Italy, and Asia Minor, so that the goddess outlasted her pharaohs for some centuries. And some would say that she still survives under the name of the Virgin Mary, who also, you may recall, bore a sacred son. But those matters I leave to others.

The image of Isis and Serapis (Osiris) with entwined fish-tails, or serpent-tails, whichever you prefer, is remarkably similar as an iconographical motif to one found thousands of miles away at about the same time in China. And this most certainly was something I did not appreciate when I originally wrote *The Sirius Mystery*. For it is since that time that I have become so deeply involved with China and the history of Chinese culture (for which see the recent discussion appended to Chapter Six). I shall now say something about the Chinese amphibious culture heroes and founders of civilization, to show just how widespread the 'Oannes' story really is.

The Chinese have always maintained that their civilization was founded by an amphibious being, with a man's head and a fish tail, named Fuxi (old spelling Fu Hsi).

伏羲 The date traditionally ascribed to him is 3322 B.C.<sup>23</sup> He was the Celestial Emperor before the founding of the first, Xia (Hsia) 夏 Dynasty of China by Emperor Yu. His wife, also said to be his sister, was Nü Gua (sometimes called Nü Wa, old spelling Nu Kua) 女媧. They were the traditional founders of civilization, just as Oannes was to the Babylonians. Fuxi is described in the third-century-BC Great

Appendix to the Chinese *Book of Change* as follows:

Anciently, when Fuxi had come to the rule of all under Heaven, he looked up and contemplated the forms exhibited in the sky, and he looked down, contemplating the processes taking place on the earth. He contemplated the patterns of birds and beasts, and the properties of the various habitats and places. Near at hand, in his own body, he found things for consideration, and the same at a distance, in events in general. Thus he devised the eight trigrams, in order to enter into relations with the virtues of the bright Spirits, and to classify the relations of the ten thousand things.<sup>24</sup>

Fuxi is credited with inventing the system of the trigrams and hexagrams of the *Book of Change*. These were revealed to him by another amphibious being who rose up out of the Yellow River, and who had the patterns displayed upon his back (the so-called 'Ho Diagram', known to have been preserved at the Chinese court in a place of honour in 1079 B.C.)<sup>25</sup> The particular arrangement of hexagrams called the Fuxi Arrangement is identical to the one which Leibniz realized corresponded to the system of binary numbers (zeroes and ones), which Leibniz introduced into Europe, and which is now used as the basis of all modern electronic computing.

Fuxi and Nü Gua repaired the heavens which had been broken and were the founders of civilization after the Great Flood. In Han Dynasty times (2,000 years ago) they were often depicted with entwined fish-tails holding a carpenter's square and a compass, indicating their importance for measuring and surveying (the *Book of Change* also says they invented nets, a possible reference to latitude and longitude). Joseph Needham translates a portion of the *Chou Pei Suan Ching* [new spelling *Zhou Bei Suan Jing: The Arithmetical Classic of the Gnomon and the Circular Paths (of Heaven)*],

dating from the sixth century BC and text formalized in the first century BC, often said to be the oldest surviving Chinese mathematical text.

May I venture to enquire how Fuxi anciently established the degrees of the celestial sphere? There are no steps by which one may ascend the heavens, and the earth is not measurable with a foot-rule — what was the origin of these numbers?<sup>26</sup>

The most ancient Chinese cosmology was also attributed to Fuxi. It is called the *Gai Tian* (old spelling: *Kai T'ien*), 蓋天 Theory. This depicted the night sky as a hemispherical dome viewed from inside. The origin of this cosmology of a double-vault theory of the world is recorded in the *Dynastic History of the Jin* (old spelling: *Chin*) Dynasty (265 AD–420 AD) as follows.

The theory originated from Fuxi's setting up of degrees for the circumference of the heavens and for the calendar.

The sun . . . cuts across the seven barriers (declination-circles) and the six roads (between them). The diameter and circumference of each barrier . . . can be worked out mathematically by using the method of similar right-angled triangles and observing the lengths of the shadows of the gnomon. The measurements of distances of the pole, and of the motions, whether near or far, are all obtained from the use of the gnomon and the right-angled triangle which it forms."<sup>27</sup>

As Needham points out . . . a similar double-vault theory of the world existed in Babylonia. It would have been one of the culture-traits which passed both westward to the Greeks and eastward to the Chinese, to be developed in both civilizations into the theory of the celestial sphere.<sup>28</sup> Needham insists



correctly upon the Babylonian origins of Chinese astronomy and cosmology. We can see that Qianxun was transmitted along with the astronomy and that the Chinese identified him, by the name Fuxi, as the inventor of the system.

The greatest of all the historians of China was Sima Chien. His *Historical Records* were written circa 91 BC. A descendant, Sima Zheng, added a preliminary chapter containing mythological lore circa 720 AD. In this he described Fuxi and Nu Gua. Fuxi is there given two alternative names, Taihao ('Great Brilliant'), and Paoxi. The physical description of him says, 'He had a serpent's body, a man's head, and the virtue of a sage. He worked out a system of recording by tablets. he was called Fuxi ('hidden victims'). He made the thirty-five-stringed lute.' He is also clearly associated with the first day of Spring. As the translator, Herbert J. Allen, records, 'Fuxi (by which name this worthy is best known) is said to have been born after a gestation of twelve years.' Whether this is intended as a peculiarity of the amphibians who carry their young for many years, or, as Allen believes, a reference to the orbital period of the planet Jupiter, or indeed of some other significance, is anyone's guess. According to Sima Zheng, Nu Gua also 'had the body of a serpent, the head of a man, and the virtue of a holy man.' But in this account, Nu Gua is not a female who is the wife of Fuxi, but rather Fuxi's successor: 'He came to the throne in the room of Fuxi, under the title Nuxi. In his last year one of the princes named Gong Gong, whose duty it was to administer the criminal law, became violent and played the tyrant. He did not rule properly. He also fought with Chuyong [also called Chungli, the God of Fire] and was not victorious, when, falling into a rage, he butted with his head against the Incomplete mountain, and brought it down. The "pillar of heaven" was broken and a corner of the earth was wanting.' Nu Gua fortunately repaired this damage and then:

'After this the earth was at rest, the heaven made whole, and the old things were unchanged' <sup>19</sup>

If we examine the Chinese myths, we find that there were a number of amphibious beings, in addition to Fuxi, his wife, and the being from the Yellow River who revealed the hexagrams. There was the other mythical hero in China called Gong-Gong, last mentioned, (old spelling Kung-Kung) 共工 who was 'a horned monster with the body of a serpent', and who corresponds to the Ogo of the Dogon or the Ser of the Egyptians. Gong-Gong was a rebel engaged in a cosmic struggle, who crashed against a mountain and was responsible for the Earth tilting on its axis. 'Heaven and Earth have since that time sloped toward one another in the northwest but have tilted away from one another in the opposite direction' <sup>20</sup> Two other amphibians at the beginning of Chinese history were the mythical Emperor Yu 禹, first emperor of the first dynasty called Hsia (supposed to date to 2205 BC) and his father Gun (old spelling: Kun). The Chinese character for Gun 鯀 contains the element (on the left side) meaning 'fish', and that of Yu contains an element commonly used with reptiles, so that both mythical heroes were 'of non-human origins' <sup>21</sup> It was Yu who conquered the Great Flood or Deluge in Chinese myth. There are various peculiarities to the myths relating to Gun and Yü. First of all, Yu was born from his father's own belly, which indicates the same androgynous aspect of the amphibians which are related by the Dogon. And after giving birth, Gun became a black fish or yellow dragon and plunged back in the sea, like Oannes. Yü was evidently not born on earth, because once he was born he 'came down from on high'. He could not walk properly and had a peculiar gait which was ever afterwards known as the 'walk of Yu', which is what one would expect of an amphibian with a fishtail. One of his prime concerns was to measure 'the dimensions of the world from east to west and north to south' <sup>22</sup>

We see that there were at least six separate identifiable amphibious beings involved in the founding of Chinese civilization, according to the mythological traditions. There was a seventh as well. Fuxi was said to have had a daughter, Fu Fei, who lived in the Lo River and became its goddess.<sup>33</sup> We should remember that there were anywhere between six and eight amphibious *Annedoti* in Babylonia, and often they were referred to as 'the Seven Sages'

A number of exceedingly strange old Chinese bone carvings bearing archaic characters which cannot be later than the third century BC, and may be a great deal older, appear to portray the amphibians, and they somewhat resemble the Dogon drawings of the *Nommo*. These were collected by L. C. Hopkins, who got them from a collector of Shang Dynasty oracle bones who was forced to sell up in 1910 because of political events. It is implied but not clearly stated by Hopkins that the five bone carvings which he thus acquired were also found at Anyang and were associated with the Shang material, in which case they would have been 3500 years old rather than 2,200, the inscriptions on the carvings appear to be Shang script. I have only found a single account of these carvings, in the report of them published by Hopkins in 1913, which contains photographs of four of the objects. (These photos would not reproduce well here because they are not of very good quality)<sup>34</sup> They bear either single or double (bi-form) fish or serpent tails. Vestigial legs pressed close to the body have only four toes. The heads have long beards and staring eyes. Two of the specimens indicate a small horn on the head. Hopkins records a few of the Chinese characters inscribed on what he calls his 'dragon carvings', the five main carvings, as well as on 'six miniature dragon forms acquired at an earlier date'. These include prominent occurrence of the character meaning 'rain', and on one of the large carvings the character *long* meaning 'dragon'. Another bears a typical mid-second millennium BC Shang oracle

inscription 'The king inquired as to the omens (The character for 'king' being *wang*, and thus preceding the unification of China.) Hopkins closes by saying: 'And there, for the time, I am fain to leave these oracular relics of an amphibious and ambiguous past . . . I have no idea of the whereabouts of the objects today, nor have I ever seen any mention of them more recent than 1913

The 'dragons' of archaic China were associated with the stars in a curious way. The celestial dragon, known as *chen* 辰, also represented 'beacon stars' including Orion's Belt.<sup>35</sup>

Water spirits, river gods, supernatural fish, and so forth have been part of Chinese folklore for millennia. Although such beliefs doubtless remain amongst the people in remote areas of the countryside (it should be remembered that 800 million Chinese live in the countryside), it appears that the surviving traditions relating to the ancient amphibians are strongest amongst the hill tribe minorities, such as the Yao People of Guangxi Province. Many studies of the traditions have been published in Chinese, but one in English published in 1982 by Chan Ping-ling summarizes much of the contemporary Minorities folklore on the subject. The current traditions tend to stress the Great Flood and the sexual aspect of the incestuous marriage between Fuxi and Nu Gua, which led to the repopulation of the world after the Deluge. It is interesting that in the ancient legend of Fuxi, he had a black dog as his companion, and his instructions to his successor Yu were to 'measure the universe', he was 'a god with a human face and a serpentine body'.<sup>36</sup> It may be that certain details of the appearance of the amphibians, surviving from ancient times, are embodied in much more recent folklore of Chinese water demons. For instance, de Groot records some curious details, stressing how shocking it was that the water demons wore no clothes at all and had naked buttocks, and a man who saw one said "that neither its eyes nor eyebrows

were marked with black. The creature reared itself straight up in the water, rigid, with a neck as immovable as that of a wooden image.<sup>37</sup> Such details may be entirely fanciful or they may go back to the original descriptions of Fuxi and his colleagues, concerning whom most ancient texts are lost. There were still temples dedicated to the worship of Fuxi as recently as 1945, when Needham visited the chief one at Tianshui, in the remote Western Chinese province of Gansu (old spelling: Kansu) — and Needham says he noted 'the mermaid tail still iconographically prominent'.<sup>38</sup> Everyone who knows anything at all about China is aware of how prominent the dragon is as a symbol there, from the dragons which prow the streets on festivals, to cushion designs, restaurant signs and company logos. It is thought that the Chinese dragon concept originated from the tradition of the amphibious beings who founded civilization. G. Willoughby Meade, who made a specialty of studying the histories of mythical and legendary Chinese beasts and monsters, says 'The earliest extant drawings of Chinese dragons are of rude workmanship, and very fish-like of aspect, in the next artistic stage, as exemplified by the jade funeral-objects of the Han period — roughly two centuries BC and two centuries after the transition towards a vigorous and plastic reptile-form is clearly shown'.<sup>39</sup> It seems, therefore, that the fish-tailed beings were transformed into dragons over the millennia of Chinese history, and that it is to them that we owe the now ubiquitous dragon in China.

In Figures 50 and 51 we see representations of Fuxi and Nu Gua with their fishtails entwined, as they were envisaged 2,000 years ago. It is worthwhile having given this summary of the Chinese tradition to show how widespread the story really is in the world of the founding of civilization by heavenly amphibians. However, the astonishing similarity between these Figures and Plate 31 — which shows Isis and Serapis with similar entwined tails, raises the question as to



*Figure 30* Two of the fish-tailed founders of Chinese civilization, Fuxi and Cang Jing, from a bas-relief in the Han Dynasty Wu Liang tomb dated to the second century A.D. The inscription says that they governed the world within the seas, created the trigrams (the system of the *Book of Change*) and established kingship. Fuxi is holding a carpenter's and mason's square as an emblem of his role as creator of civilization. Fuxi is normally shown with his tail entwined with that of his wife, Nu Gua. Between them the two main figures hold a baby fish-tailed creature, whose two legs are separate tails, as is often seen with the Greek Triton figures. The iconography of this illustration is eerily similar to that of Plate 31, showing Isis and Serapis with entwined tails, excavated at a site thousands of miles from China. How did the image travel so far?

how such dramatically similar representations could possibly exist several thousand miles distant from each other in wholly different cultures. A direct borrowing by the Chinese seems likely, but why would the Chinese borrow an image and then set it at the very centre of their culture, representing their own cultural origins, when it came from the Mediterranean region? It seems to me that we cannot continue to allow the issue of Fuxi and Nü Gua to languish in neglect. Their

iconographical representations in dated tombs of the Han Dynasty pose a very direct problem regarding culture contacts between China and the Near East, or otherwise point to some other factor equally puzzling. In either case, a thorough study of the fish-tailed founders of Chinese civilization should be undertaken by someone capable of dealing with the highly specialized areas of Chinese mythology and folklore, Han Dynasty and earlier evidences both textual and archaeological. Probably no single person



*Figure 51* Five amphibious founders of Chinese civilization portrayed in a Han Dynasty (first century AD) tomb rubbing, published by Edouard Chavannes in his book *La Sculpture sur Pierre en Chine*. Han, Paris, 1893, Plate 24. Fuxi, the large figure on the right, as usual holds the carpenter's or mason's square with which he measured the earth. His tail is entwined with that of another amphibian, possibly his wife Nu Gua, or possibly Cang Jing. In the centre a smaller pair of amphibians with entwined tails also holds hands. On the right, a fifth amphibian looks on. To the left, the tail of a sixth amphibian seems to be represented, but we cannot see him fully. Waves and billows of the sea are represented beneath the group.

## THE SIRIUS MYSTERY

could command the expertise to do the entire study alone. But it should be done.

\*\*\*\*\*

Let us take a look now at what the Dogon tribe have to tell us about the amphibious creatures who are credited with founding their civilization as well, and who seem to have come from Sirius. In Figures 52 and 54 are Dogon tribal drawings of what the creatures actually looked like. They are credited with having descended in an ark which, in landing, looked like Figure 55 which portrays 'the spinning or whirling of the descent of the ark'. The god of the universe, Amma (whose name I feel certain is a survival of that of the god Ammon of the Oasis of Siwa), sent the amphibians to earth. They are called the Nommos. But just as the Babylonians tended to speak of Oannes, the leader, instead of always saying 'the Annedoti' collectively, the Dogon often just speak of 'Nommo' or 'the Nommo' as an individual. The Nommos are collectively called 'the Masters of the Water' and also 'the



*Figure 52 Dogon drawing of Nommo*





*Figure 13* Descent of Nommo from the sky Dogon drawing

Instructors', or 'the Monitors' They have to live in water 'The Nommo's seat is in the water' <sup>40</sup> The latter is much like the Babylonian tradition of their god Ea (Enki to the Sumerians), whose seat was also in the water and who is sometimes connected with Oannes.

The descriptions of the landing of the ark are extremely precise. The ark is said to have landed on the earth to the north-east of Dogon country,<sup>4</sup> which is where the Dogon claim to have come from (originally before going to Mande) and that is, of course, the direction of Egypt and the Middle East in general.

The Dogon describe the sound of the landing of the ark. They say the 'word' of Nommo was cast down by him in the four directions as he descended,\* and it sounded like the echoing of the four large stone blocks being struck with stones by the children, according to special rhythms, in a very

\* The reader will recall that near the end of Chapter 2 I mentioned that the 'word' represents a concept like the *logos* to the Dogon (for it means 'air'). We may take this description to refer not only to noise but to a rushing wind.



Figure 54 Dogon drawing of Nommo

small cave near Lake Debo.<sup>42</sup> Presumably a thunderous vibrating sound is what the Dogon are trying to convey. One can imagine standing in the cave and holding one's ears at the noise. The descent of the ark must have sounded like a jet runway at close range.

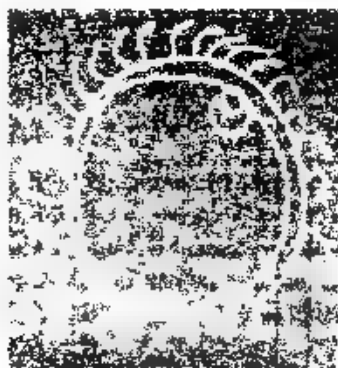


Figure 55 The whirling descent of the spaceship of Nommo Dogon drawing

## A FABLE



Figure 56 Dogon drawing of *se petu to.o*, the ten rays, in pairs, are inside the circle, having not yet 'emerged'

The landing of the ark is visually described <sup>43</sup> 'The ark landed on the Fox's dry land and displaced a pile of dust raised by the whirlwind it caused' For this, see Figure 53. They continue: 'The violence of the impact roughened the ground . . . it skidded on the ground.'

It is said of Nommo, or more probably of his ark: 'He is like a flame that went out when he touched the earth' They say: 'The Nommo was "as red as fire" . . . when he landed, he became white' <sup>44</sup> And consequently a bit of folklore: 'The albino is the testament on Earth of the Nommo's burns as he came down, he is said to be the "trace of the burn", the scar of the Nommo' <sup>45</sup>

There seems to be a use by the Dogon of 'spouting blood' to describe what we would call 'rocket exhaust'. And let us remember that, short of anti-gravity machines (which may be impossible), rocket propulsion is likely to be used by craft landing on any planet, no matter how sophisticated and non-rocket-like the interstellar main craft, or no matter how immensely advanced the civilization may be which is making



Figure 57 Three states of *te pelu tolo* in the sky Dogon drawing

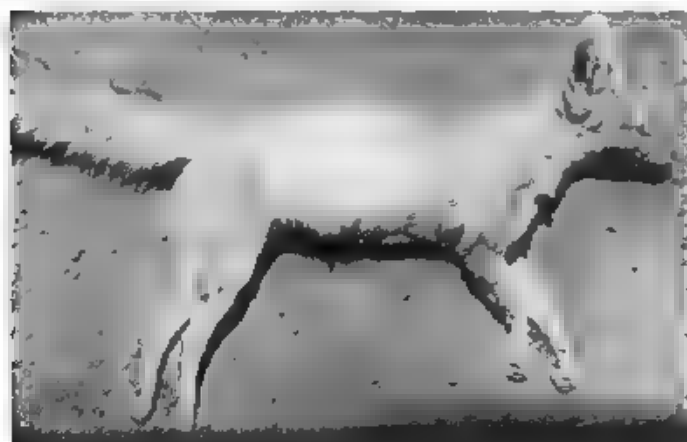
a landing on a planet. For the principle of the rocket is a simple one unlikely to be dispensed with entirely in any foreseeable future technology. Actually, the Dogon seem to make a clear differentiation between the ark in which the Nommos actually landed on earth and what we may surmise was the true interstellar spaceship hovering above in the sky at a great distance, and which the Dogon seem to describe as appearing in the sky as a new star, and leaving with the Nommos at their departure from Earth. In fact, this is the sort of arrangement one would expect. An interstellar spaceship would probably look like a bright new star, possibly visible in daytime as well as by night, and the landing craft would be simple rocket-propelled craft not so different in principle from machines which we ourselves have used for landing on the moon.

The Dogon may describe the interstellar spaceship hovering high above the Earth by what they call *te pelu tolo*, 'star of the tenth moon'. The Dogon say 'As (the ark) landed, the weight of the ark caused the "blood" to spurt to the sky'.<sup>46</sup> This would seem to be a rocket craft landing on earth. But this 'spurting blood' (flame?) is said to be shared with *te pelu*



1 A family portrait: the first photograph ever taken (1970) of Sirius B, which is the tiny dot to the lower right of the large star, Sirius (small multiple images of Sirius itself are seen here extending off to left and right). See Notes to the Plates. © *Irving Landenblad* US Naval Observatory

2 The 'pale fox' (*yuragu*) of Mali, *Vulpes Pallidus*. It only emerges from its lair at night and is never seen in the daytime



The four Dogon priests who revealed the Sirius traditions to anthropologists.



3 Manda D'Orosongo



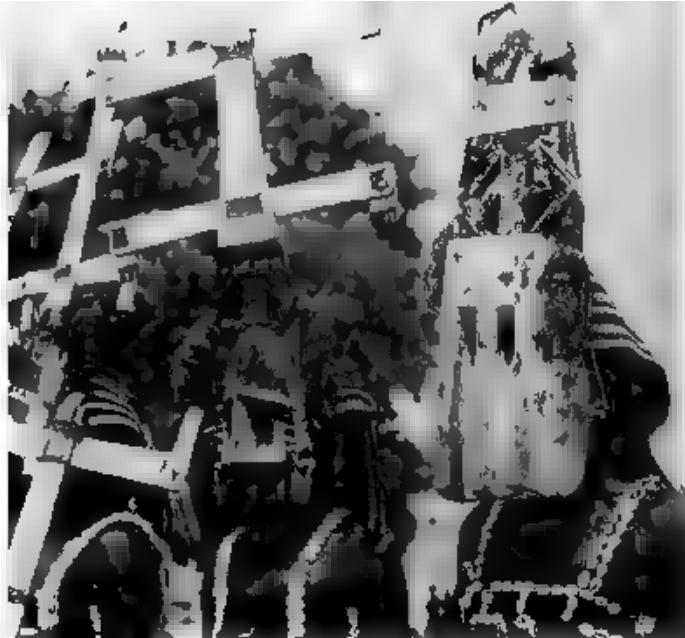
4 Onghonou



5 Innekouzou



6 Yébé



7 (Above) Dogon dancers in Sanga. © A Costa

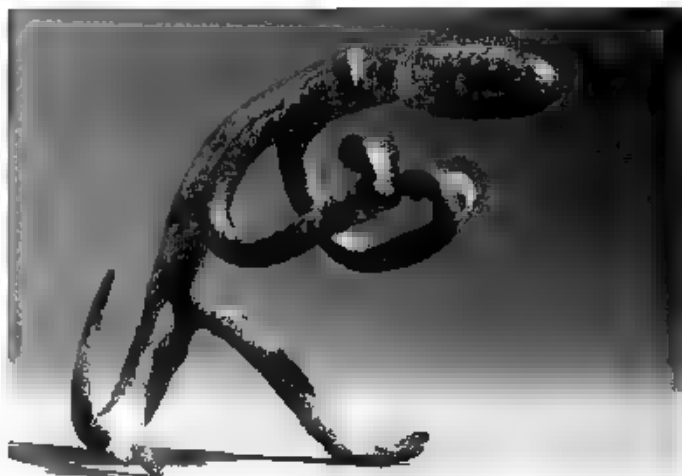
8 (Below) One of the Dogon initiates is being adorned with an earring prior to the Sigu ceremony. © A Costa





9 An ancient Dogon iron statue, probably at least 300 years old, depicting the 'men with wings' who are reputed to live on 'the sixth Earth' – a planet in yet another nearby star system, neither our own nor that of Sirius. The Sirians know them but they have not taken part in the Sirian project on Earth and leave us to the care of the Nommos. We live on 'the fourth Earth' and 'men with horns' live on the third, while 'men with tails' live on a fifth. In all, the Dogon claim that there are five or six solar systems with intelligent life in our vicinity. *From the Lester Wunderman Collection, New York. Photo by Lester Wunderman*

10 The only known Dogon iron statue of the Nommo from Sirius, believed to be three or four hundred years old. Here the tail is more serpent-like rather than fish-like, and there are legs and arms without any knees or elbows, and both feet and hands designed for swimming. *From the Lester Wunderman Collection, New York. Photo by Lester Wunderman*







11. Krater [Cup] Number E466 in the British Museum. The scene portrays the heliacal rising of Sirius. Orion is in the centre, turned backwards in his customary pose with his right arm raised as in the configuration of the constellation, and with his pelvis at the angle made by the stars of the 'belt of Orion'. Beneath his right foot is Canis Major, the dog of Sirius, who has just risen. On the right of the scene, Eos, the winged goddess of dawn is chasing Sirius and Orion away, as it is now time for daybreak. (On the other side, out of our sight in this photo, the sun god in a four-horse chariot is holding his impatient horses back while Eos clears the way for rising.)



12. The towering mass of Mount Ararat in Turkey, where the Biblical ark landed  
© Sonia Halliday



13. The nearby site of Metsamor, a major religious cult centre and astronomical observatory which has never been satisfactorily studied (all relevant publications are in the Russian and Armenian languages). © Mrs Charles Burney

Omphalos ("navel of the world") stones from three ancient cultures: Greek, Egyptian and Mesopotamian. See Notes to the Plates.



14. Delphi © Scala



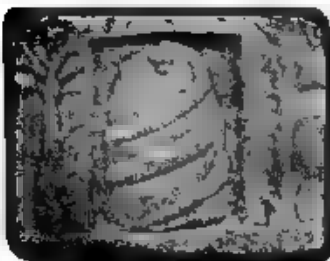
15. Delos



16. Miletus – it shares the palm motif with Delos, which is on the same latitude



17. Babylonian  
© Michael Holford



18. Delos



19. Egyptian



20. The magnificent site of Delphi in Greece, with ruins of the oracle shrine, the Temple of Apollo. © *Alinari*

2. (Opposite page) Bas-reliefs and coins showing evidence of oracle centres and use of omphalos (navel) stones. Two coins, bottom, from Delphi show the famous 'H' suspended in the centre of the entrance to Delphi's Temple of Apollo (See Appendix V). The two coins immediately above them show the Temple of Apollo at Delphi with the statue of the god. See Notes to the Plates © *Bodleian and British Museum*





22. Jason, Medea and the teeth of the dragon from an ancient vase painting. See Notes to the Plates. © *Metzler*



23. An ancient Babylonian cylinder seal which may show the sowing of the sown dragon's teeth. See Notes to the Plates. © *Oriental Institute, University of Chicago*



24. Jason and Medea with a living fleece being transmuted alchemically into gold. See Notes to the Plates. © Michael Holford



25. A Babylonian cylinder seal in the British Museum (Number Bp.110) which depicts the heliacal rising of Sirius. See Notes to the Plates for full explanation.



26 An ancient representation of the construction of the ship *Argo*. On the left the goddess Athena bestows the oak timber of Dodona. Argus is hard at work on the prow, which will contain the oak beam. An oak tree graces the scene, with a branch pointing upwards. © *Alinari*

27 Argus (Argos), who had a hundred eyes all over his body, being murdered by Hermes at the command of Zeus. See Notes to the Plates





28. A Greek painting on ceramic of the 'Old Man of the Sea', Nereus. He had daughters called the Nereids, who were either fifty (according to Hesiod and Pindar) or one hundred (according to Sophocles) in number. He thus combined the Oannes tradition with the fifty/one hundred tradition, as did the similarly amphibious Typhon, who was said to have fifty heads. Nereus began to be represented in Greek art in the early sixth century BC. However, it is believed that he was the original sea god of the Greeks, and that the more famous Poseidon displaced him from his position at an early date.



29. An ancient vase painting showing the fish-tailed female monster, Scylla (*Skylia*), with a dog's head protruding from her waist. According to Homer, Scylla lived in a cave opposite the whirlpool Charybdis and ate sailors as they went past her. She was said to bark like a dog. The Greek name for dogfish was *skyllion*. The name Scylla probably came from *skylax*, which means a 'young dog'. In her attributes and name, Scylla thus combined the dog motif of Sirius the Dog Star with the fish-tailed and human-headed nature of Oannes.

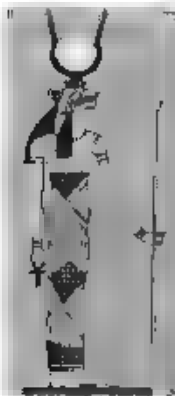




30. A painting from an Etruscan amphora formerly in the Royal Museum of Berlin, whereabouts now unknown. The subject is called Dagon (i.e. Oannes) by Lersormant and de Witte, from whose *Filae des Monuments Céramographiques* Paris, 1858, Vol.III, Plate 35 this is reproduced. However, it is probably more correct to identify it as Tyrrhenus, the Etruscan Oannes, god of the Tyrrhenian Sea.



31. These two cult objects from the worship of the goddess Isis during the Graeco-Roman era were excavated at the Greek city of Cyzicus, in ancient Phrygia, opposite Byzantium. Both show the goddess Isis with a serpent's tail, and the bronze statue on the right shows her with her tail entwined with that of her husband Serapis (a later name for Osiris). See Notes to the Plates.



32. (Far left) The goddess Isis, showing the small fishtail in her headdress.

33. (Left) Votive Stela from the Temple of Tanith at Carthage. At bottom, two oracular doves flank a painted stone or pyramid topped by a symbol of the navel of the earth.



34 (Above left) The remains of a giant statue of Oannes found at Kouyunjik

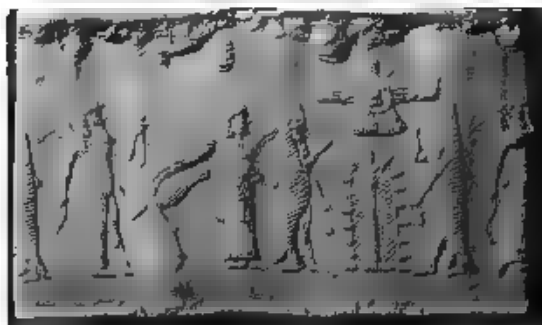
35 (Above right) A pottery representation of Oannes, or of a priest dressed in an Oannes costume. A fish head surmounts a human head, a fin protrudes from the back, 12.6 cm high. Believed to have been excavated at Nineveh by Layard in the mid-nineteenth century. British Museum Dept of Western Asiatic Antiquities, Inventory No. 91,837



36 and 37 Two views of another Oannes figure, No 91,836, also 12.6 cm high, found with the other presumably at Nineveh. From the side this figure seems to be entirely a fish standing upright but from the front we see the human face and in one hand the sacred basket is held. Such figures would have been buried together as a foundation dedication for an important building or temple. Their Babylonian name is *apkallu*, there were usually seven in all, and they were the original 'Seven Sages' who founded civilisation.



38 and 39  
Further  
representations  
of the  
amphibious  
heavenly  
being, Oannes,  
from Assyrian  
cylinder seals  
© Pierpont  
Morgan  
Library/  
Staatliche  
Museum zu  
Berlin



40 and 41 Front and side views of a bust identified as that of the Greek  
philosopher Proclus, for whom see Appendix II; see also Notes to the  
Plates. © Athens Museum

*tolo*, and 'gave the star reality and brilliance' <sup>47</sup> For three different complementary tribal drawings of *te pelu tolo*, see Figure 57. These seem to represent the 'star' in three separate conditions, differing in the amount of 'spurting blood' being emitted by it. The Dogon also describe this 'star' specifically as having a circle of reddish rays around it, and this circle of rays is 'like a spot spreading' but remaining the same size <sup>48</sup>.

It is said that the Nommos will come again. There will be a 'resurrection of the Nommo'. It should thus not surprise us that the celestial symbol of the resurrection is the "star of the tenth moon", *te pelu tolo*. This star is not easy to see. .

The ten rays, placed in pairs, are inside the circle because the star has not yet "emerged", it will be formed when the Nommo's ark descends, for it is also the resurrected Nommo's "eye" symbolically <sup>49</sup> In other words, the 'star' is not a star, and can only be seen when the Nommo returns and his ark descends to Earth. In Chapter One I have discussed the star of the tenth moon at length and suggested that it remains in our own solar system as the tenth main moon of Saturn, Phoebe, and that is the base of the visiting Nommos who will by now have awakened from suspended animation.

The Nommo is 'the monitor for the universe the "father" of mankind, guardian of its spiritual principles, dispenser of rain and master of the water generally' <sup>50</sup> Not all the Nommos came to Earth. The 'one' called Nommo Die, or 'Great Nommo', remained 'in heaven with Amma, and he is his vicar' <sup>51</sup> He manifests himself in the rainbow, which is called 'path of the Nommo' <sup>52</sup> He is guardian of the 'spiritual principles of living creatures on Earth'. <sup>53</sup>

There are three other distinct kinds of Nommo, each personified as an individual. There is the Nommo Titiyavne, 'messenger (or deputy) of the Nommo Die' — he (executes) the latter's great works. <sup>54</sup> The Nommos who came to earth in the spaceship are presumably of this class. Figures 52 and 54 represent these beings in particular.

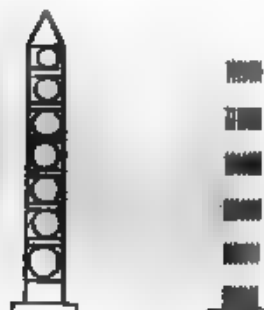


Figure 58. *Sirigi* designs of the Dogon

A third class of Nommos are represented by O Nommo, 'Nommo of the pond'. 'He will be sacrificed for the purification and reorganization of the universe. . . . He will rise in human form and descend on Earth, in an ark, with the ancestors of men. . . . then he will take on his original form, will rule from the waters and will give birth to many descendants.'<sup>55</sup> This suggests that a group of Nommos volunteered to be reincarnated as humans during the period of official absence from Earth of the Nommo Titivayne leaders.

The fourth Nommo is the naughty disrupter named Ogo, or Nommo Anagonno. 'As he was about to be finished (being created) he rebelled against his creator and introduced disorder into the universe. Eventually, he will become the Pale Fox (*le Renard pâle*) which is the image of his fall.'<sup>56</sup> In many ways, the Fox resembles the Egyptian deity Set.

The name Nommo comes from a Dogon word linked to the root *nomo*, 'to make one drink'. It is said: 'The Nommo divided his body among men to feed them; that is why it is also said that as the universe "had drunk of his body" the Nommo also made men drink. He also gave all his life

principles to human beings.<sup>57</sup> He was crucified on a *kilena* tree (*Prosopis africana*, a source of charcoal) which also died and was resurrected.<sup>58</sup>

After the ark had landed, according to the Dogon, an interesting series of events took place which make a great deal of sense. If one remembers that amphibious creatures were inside. Something described both as a 'horse' and just simply as a 'quadruped' appeared which pulled the ark with ropes to a hollow.<sup>59</sup> 'This stage, momentarily, transformed the ark into a chariot drawn by a quadruped with ropes.'<sup>60</sup> The hollow then filled with water. However, an untoward incident then occurred: 'After the first rainfall, when the water had filled the pond, the water-insect entered the water. It wanted to "bite" the Nommo's head. But it was unable to reach the edge of the ark.'<sup>61</sup>

The bad 'water-insect' was thus unsuccessful in wishing to do harm. When the water filled the pond, the ark floated on it like a huge pirogue [a dug-out canoe]. It is said 'The great ark came out of the sky and came down. In the centre the Nommo was standing, he came down. Then he returned to the water.' From then on he was called O Nommo, 'Nommo of the pond', through respect men will not utter this name, but will call him instead *dé tigi*, 'master of the water'.<sup>62</sup>

Thus we see that the second and third categories of Nommo are really the same, but represent successive states. And as for the future:

His twin who will descend later on with the Blacksmith, 'twin of the victim', will also be transformed in the pond. They will have many descendants and will always be present in the fresh 'male' water of the brooks, rivers, ponds and wells and also in the 'female' sea water.<sup>63</sup>

As for this reference to fresh water as male and sea water as female, it is similar to the ancient Babylonian and Sumerian tradition where Apsu (Abzu - see p. 244) was a male fresh-water deity and Tiamat a female sea-water deity. The Dogon say,<sup>64</sup> 'O Nommo has his seat in the waters of the earth' which could just as well be a description of Enki/Ea, whom I mentioned above.

I feel impelled to reproduce in this book as Figure 58 a Dogon drawing showing four variants of the Dogon *srigi* mask design. Anyone can see that they look like rocket ships. Griaule and Dieterlen give<sup>65</sup> detailed accounts of the meanings of the lozenges, rectangles, etc. These variant designs are said specifically all to represent 'the descent and impact of the ark'.<sup>66</sup> The descent of the ark was like a lozenge, its impact was like a rectangle.<sup>67</sup> Perhaps this is why the Dogon say 'When the ark was descending, space was four angles, when the ark was down, space had four sides.'<sup>68</sup> The *srigi* design itself represents a 'house with stones' (and) indicates the ark as well as its descent.<sup>69</sup> So maybe the Dogon have actually drawn a rocket ship.

The Dogon say<sup>70</sup> that 'po u to (Sirius B) and Sirius were once where the sun now is'. That seems as good a way as any to describe coming to our solar system from the Sirius system, and leaving those stars for our star, the sun. But let us now take leave of our friends the Dogon. Let us go to where Sirius and its white dwarf companion star are the suns, and where our own sun has become just another star in the sky. Let us visit the planet of the amphibians.

What are Sirius and Sirius B like as suns? We know that they revolve around a common centre, which is in fact equivalent to Sirius B revolving around Sirius A in an elliptical orbit. Sirius A, a big, bright star, has two and a half times the mass of our sun. Sirius B has - as discussed at length in Chapter



One – 1.053 of the mass of our sun, but because it is made of degenerate matter and is so tiny, this is not obvious. If Sirius B with its mass were not a white dwarf, we could see it from earth as a star of magnitude 2, if it were not for the problem of parallax, which makes it impossible with the naked eye to separate it from Sirius A. In any case, if Sirius B were on its own somewhere at its distance from earth, and were not a white dwarf, it would be one of the brightest stars in the sky.

In reality, Sirius A is ten thousand times brighter than Sirius B. The luminosity of Sirius A is thirty-five and a half times the luminosity of our sun. That makes it a pretty hot number. We can be certain that our planet is not too near it. The 'habitable zone' discussed in Chapter 2 is much farther out from Sirius than it is from our sun. As for the actual size of Sirius A, its radius is a little more than one and a half times the sun's radius. This means that Sirius will be smaller in the sky than our own sun, seen from the planet. It will be a good deal smaller, but will need to have roughly the same amount of heat, which is not too difficult, considering how terribly hot and bright it is. To us it would be a strange experience to see such a small body in the sky giving out so much heat and light.

Our planet actually orbits around the small red dwarf star Sirius C, which may in turn orbit around the tiny white dwarf Sirius B, all of them orbiting round Sirius A every fifty years. I therefore speak of Sirius A as the main Sun, as it is the centre of everything.

Our planet will probably be quite hot. In fact, it will probably even be covered with a vaporous layer of cloud at most or all times. It might look something like Venus from a distance, though of course Venus does not have temperatures or clouds of the sort which living creatures are likely to find agreeable. It would seem important to keep cool on this probably rather hot and steamy planet. Therefore intelligent life is likely to have evolved as amphibious and never have taken to the land. These

amphibians might easily inhabit the surface of the water, of course, for they would need to breathe atmosphere and would not have gills like fish — they would probably need to be like mammals of some kind in order to develop the brain sizes and other characteristics necessary for intelligence. They would probably spend a lot of time hanging about marshes and might have developed an indigenous way of life originally which involved the use of woven reeds for huts and transport, and so on. (They would long ago have got past that stage, of course.) But perhaps their first style of life, to which they may even look back with some nostalgia as 'the good old days of simplicity and a carefree existence', was something like that described by Wilfred Thesiger in his book *The Marsh Arabs*<sup>7</sup> in which the inhabitants of southern Iraq are pictured in the marshes of the lower Tigris and Euphrates (quite near where Oannes and his friends are said to have spent most of the time, one is tempted to note!).

Reeds as a building material seem to have had a profound religious importance in Sumerian and Babylonian tradition. In the *Epic of Gilgamesh*, there is a very strange and not wholly explained passage where the god Enki (Ea) who wishes to save mankind from the Great Flood, warns Ziusudra (the Noah of the Bible) in this bizarre fashion

Speaking through the wall of Ziusudra's reed hut:  
'Reed hut, reed hut! Wall of the hut, wall of the hut'

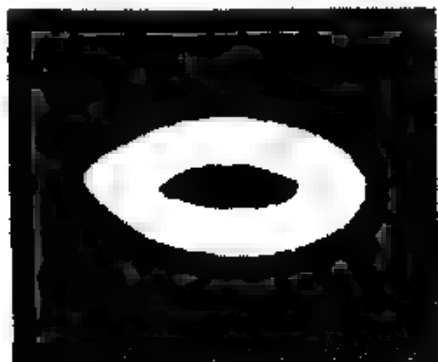
Listen, O reed hut! Consider, O wall of the hut!  
O man of Shuruppak [Ziusudra's city], O you son  
of Ubar. Tutu,  
Tear down your hut of reeds.  
Build of them a [reed] boat  
Abandon things,  
Seek life.  
Give up possessions,

## A FABLE

Keep your soul alive!  
And into the boat take the seed of all living  
creatures.<sup>172</sup>

It would seem that to the Sumerians and Babylonians, there was a nostalgic mystique attached to the (imagined) days when the founders of the world lived in simple reed huts. Imagine, then, that you live on your watery planet, and instead of harking back to Shaker furniture, as Americans do, or to country cottages with rosemary bushes, as the British do, in their cults of simplicity — you like to speak of the ‘good old days’ when even the most important people lived, like simple marsh folk, in their reed huts, without affectation.

If you were one of these creatures, you would be a good deal like a dolphin with arms and hands. (Fish seem an unpromising avenue for the evolution of intelligence due to limitations on brain size, need for gills, etc. But on Earth we see that aquatic mammals such as dolphins and whales achieve huge brain size.) You would, due to your amphibian



*Figure 59* The Nommo breathes through air-holes in his clavicles that look like this Dogon drawing

nature, have a separate blowhole for breathing in addition to your mouth. You would be able to hold your breath for long periods, and when you did breathe through your blowhole, it would be a gasp and make a bit of noise. Your blowhole would open and close almost instantaneously and your breathing would tend to be infrequent but loud and quick. The blowhole might be placed in such a way that it consisted of one or two small slits, long and thin, just beneath your clavicles (collarbones). In fact, the Dogon have a tradition that their Nommos breathed through their clavicles.<sup>23</sup>

You could not go about bare-skinned in any atmosphere for long. You would require moisture on your skin after a few hours at the most, when your skin dried you would be in absolute agony – worse than a human with sunburn. Because you would frequent the surface of the water a great deal, there would inevitably be a considerable contrast between the top half of your body and the bottom half. The tradition known to us of the mermaid expresses this state of affairs quite well. Your lower extremities would be quite fishlike, but you would have articulate limbs and fingers on your upper half and your skin would be more capable of resisting solar radiations and hence would be more like that of a land mammal. Probably cartilaginous structures would have evolved in your head to rigidify your features beyond the simple streamlined form required for a strictly undersea life, and there would be something on your upper body resembling hair – perhaps like the hair of our own walruses.

Your teeth would probably be feeble compared with those of ferocious carnivores such as sharks. You would probably have evolved from more peaceful creatures capable of feeding on small fish in considerable numbers. Your ancestors would have travelled in packs as the dolphins do and you would be extremely sociable because you evolved in schools (packs). Nudity is probably the natural state of your species. Overpopulation is not one of your problems because

most of your planet is water and all of the water is habitable. Even on the planet Earth, it is estimated that dolphins outnumber human beings two-to-one, and the oceans are hardly overcrowded.

As one of these creatures, you might find human beings repulsive, for many reasons. Their rough hair, dry skins, bony limbs, and particularly their pungent smells might disturb you greatly. Their sweat is not continually washed away in the way that your skin is continually cleansed by the watery medium which you inhabit. And as an amphibian you have exceedingly well-developed senses of smell and taste. You 'taste' smells or spoor-substances underwater at enormous distances and though your sense of smell is not quite as acute, it is competent enough.

One of the most disturbing sights to you is to watch human beings walking. When humans stand still with their legs together, they look almost normal. But then suddenly they 'split' into two and begin walking, which makes you slightly dizzy and upsets you. It makes you feel nervous with the thought of how dreadful it would be for you if you 'split' and thereby became a cripple in the water. You admire the agility of the humans on dry land. They can climb trees and cliffs, all of which is terribly impressive. They can go at a great speed on land with what they call 'running', and they even have a certain capacity to jump over obstacles; they are not as swift on land as you are in water, but they do passably well. You do have difficulty in seeing them sometimes because, as you are in a watery environment, your vision is not good at long range.<sup>74</sup> And the humans, being dry, do not stand out against their background as much as you could wish. When they move you can instantly detect motion without optical definition, but a stationary human who is even approximately camouflaged and blends with this background is impossible for you to differentiate with your unaided eye. You rely on your sense of smell, like a

rhinoceros. But when the wind is against you, you have no hope. A human can easily elude your perception on dry land. If he knows what he is doing and you do not have your goggles or technical aids with you.

You would have an extremely agile mathematical mind. Your ancestors developed from the primitive state by computing the intricate astronomical phenomena and radiations falling on your planet without benefit of direct optical observations. The brains of your species were thus engendered to conceive and solve vast intricate abstractions. Your powers of holding complicated mathematical structures suspended in your mind's eye while performing mathematical operations on them is extraordinary. You have a phenomenal conceptual and generalizing faculty. It is easy for you to conceive of invisible, and even unperceptible, forces, because your daily environment is a suggestive, allusive one. You taste and smell your ambience rather than see it. Your powers of telepathy may be extremely highly evolved—possibly a characteristic of your species from their earliest history.

The climate range of your planet is greater even than the Earth's because there are no ice caps, due to there being more radiation from the three stars in your multi-solar system. Your oceans are all the more extensive, therefore, for not being locked up in ice caps at the poles.

Space flight is less uncomfortable for you than for humans, as the state of weightlessness is often approximated under water (indeed, on Earth the astronauts train under water). Your blood circulation is thus better suited to the weightless condition than is the case with humans and you do not at all mind living in the gigantic water tanks orbiting your planet which constitute your many satellite space cities. It is not as difficult to simulate a watery environment in space as it is to simulate a dry land environment. Your wants are few, your existence simple. You do not eat cooked food and you do

not have stoves to keep warm. Farming for you is mostly the breeding of delicious small fish, and meals are an adventure as you love a good chase and the satisfaction of catching your food. Dinner is a family sport.

*Additional Comments (1997)*

In 1989 some extremely bizarre discoveries were made about dolphins which may have a relevance to the Sirius mystery and to the Nommos. Dr Margaret Klinowska of the Research Group in Mammalian Ecology and Reproduction at Cambridge University and David Goodson of Loughborough University's Sonar Research Group in Britain announced that there is something very strange about dolphins' *teeth*. They discovered that they act as highly sensitive sonar receivers. A report of these findings said:

As they move through water, dolphins emit high frequency clicks, creating echoes which tell them how far they are from any nearby objects or fish.

Until now, it has been thought the echoes were conveyed by the dolphin's lower jaw to their ears.

But now research suggests the teeth act as receivers, picking up the pressure from the sound waves, and transmitting them via nerves inside the teeth to the brain stem.

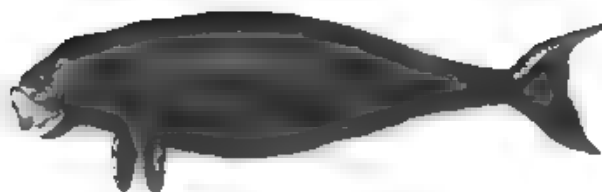
'This gives us a much deeper insight into the dolphins' sonar and explains for the first time why it's so good,' said . Dr Margaret Klinowska . 'If their teeth are acting as an array of receivers, then they have 20 on each side, instead of just the one ear' . Dr Klinowska, one of Britain's leading authorities on dolphins, said their teeth are very even in shape and spacing, and have little tubes in the dentine, arranged like the spokes of a wheel. She and Mr Goodson believe it is these tubes which act as pressure receivers.<sup>75</sup>

Perhaps this is the kind of information we have needed all along to give us the missing clues as to why *teeth* were so important in the lore concerning Sirius and the Nommos. For the tooth is the hieroglyphic sign for the goddess Sothis, and *dragon's teeth* are fundamental to the entire complex of legend. We have seen in Plate 23 a Sumerian cylinder seal showing the ploughing of dragon's teeth into the ground. Dragon's teeth were central to the Argonaut legend. And it does not take a great deal of imagination to realize that the 'dragons' were the amphibious beings. Now at last we have some hint as to why their *teeth* were so important. If dolphins' teeth are like this, it is not unlikely that the teeth of the amphibious beings from Sirius are similar.

There are oddities about the teeth of another significant earthly amphibian, the dugong. Readers have often written to me and asked me if I realized that one of the most interesting amphibious sea creatures was called a dugong. Was there any connection with the Dogon Tribe? Or at least with the god Dagon, who was amphibious? Frankly, until I started receiving these readers' letters, I had never heard of dugongs. I now have a picture of one beside me as I write—see Figure 60. A dugong is a charming creature, like a smaller manatee except that a manatee has a rounded tail, whereas the dugong has a tail exactly like that of a Dogon Nommo! (Although the Dogon Nommos are inspired by African catfish, the tail analogy holds, strangely enough.) At the time of the Gulf War, newspaper stories appeared about the danger that leaking oil sacks posed to the dugong in the Persian Gulf.<sup>76</sup> The dugong was called a 'Mermaid Beast'. It was only then that I realized the dugongs were once common in the Persian Gulf—just off the coast of ancient Sumer!

However, although the Persian Gulf dugong may be threatened, I understand that dugongs are absolutely thriving near the Great Barrier Reef. There was a newspaper report in 1990 about the prevalence of 'mermaids' there: 'The snub-





H. Dugong Dugong

Figure 60 An old engraving of a dugong, *Haliscare Dugong*, which, although it looks like a whale, is actually an aquatic Pachyderm. The name dugong may come from the ancient amphibious god Dagon of the Philistines. It is interesting that Berosus describes Onnes or Dagon as being 'slimy', since the dugong is also slimy, the skin is almost naked and oily. It likes shallow water where it can feed on subaquatic vegetation. Its eyes are very small. Anatomically, the dugong is peculiar in that it has a dual heart. Dugongs are extremely passionate about their mates; the Malays have traditionally harpooned dugongs for their meat, and there have been many cases where the mate of a slain dugong has followed the boat for long distances, unwilling to part with its spouse and often being killed for this loyalty. (I cannot help but be reminded of the fanatical loyalty to the slain Osiris shown by Isis.)

Many people have written and asked if the name Dogon has anything to do with dugong and Dagon. Nobody knows, but it is entirely probable that the chief god Amma of the Dogon is none other than the god Ammon (Amun) of the Oasis of Siwa, from which region we actually know that their ancestors migrated. And having come so far bringing that name, the name Dagon which was contemporary with it, although in another location, could in theory have been part of the package, giving the name of the Dogon. So Dogon, Dagon, and dugong could be connected. As we have seen from the survival of the astronomical information, stranger things have happened!

nosed creature has a whale's tail, hide and blubber, [But:] A dugong's life cycle does not allow room for complacency about its chances of survival. It lives for about seventy years, but a female has only a single calf every three to five years, is pregnant for a year and suckles the calf for about eighteen months <sup>27</sup>

It is the teeth of the dugong which are really interesting. A report in the journal *Biological Conservation* in 1975 only came to my attention in 1976 after the first publication of this book. According to this report:

The dugong is strange, however, in that most of its teeth seem either to be reabsorbed into the skull or worn away by use, while the so-called incisors never erupt through the bone but grow backwards into it. These incisors provide reliable material for the determination of age, but first they have to be chipped out of the bone.

Having accomplished that task with about seventy-five teeth, Dr Mitchell counted between zero, on the smallest skull, and fifty-seven and a half growth layers. Because it is not yet clear whether one or two layers are laid down each year, she can only say that dugongs have a life span just under sixty or just over thirty years <sup>28</sup>

It is evident that the teeth of aquatic mammals have a tendency to be very strange indeed. The fact that the Dogon stress the pointed teeth of the Nommos, together with all the ancient tooth traditions this seems to support the view that the Nommos have teeth with special properties, probably sonar-receivers like the dolphins' and quite possibly with a bizarre anatomical aspect such as those of the dugongs. If a tooth is like a radio and not just something with which you chomp, then it is understandable that it would take on a special significance and be referred to in myth and legend.

I should just mention the sea otter before we leave aquatic

mammals. Sea otters are remarkably intelligent creatures and they have the distinction of being one of the few animals who routinely use *tools*. People who watch a lot of nature films on television may well have seen footage of sea otters doing so. The sea otters routinely turn over on their backs, floating in the sea, and crack shells open with hard objects, and thus extract the shellfish inside. They are in fact *regular* tool-users. It used to be suggested that the use of tools was the special and defining prerogative of man, as it indicated his superior intelligence. In recent times we have come to appreciate the use of tools by monkeys, some birds and a few other creatures, even though this remains rare. But it is worthwhile realizing that there is an amphibious creature with sufficient brainpower to be a habitual tool-user. In fact, the sea otter thus joins the dolphins and the whales in the club of brainy sea-dwellers. Maybe the fact that such intelligent creatures have evolved in the earth's seas should tell us something.

But to return now to the Nommos

The amphibians must have a name, and the Dogon name for them of 'the Monitors' may be the best to consider using. 'Monitor' is more specific than 'Instructor', and 'Masters of the Water' is too long. There is no point using the euphemism the 'Annedoti', knowing that it means the 'Repulsive Ones'. A more generic and neutral term, I suppose, would be simply the 'Sirians'. If we ever come into contact with them again, they will probably be called the 'Sirians' officially, and their civilization will be the 'Sirian civilization'. Their art will fall under the heading of 'Sirian culture' and their technology will be 'Sirian technology'. But what about their religion? There's a delicate point. It will be called the 'Sirian religion' and we will try to pretend it has nothing to do with us. But inevitably we will have to take into account that, whereas 'cultures' and 'technologies' can be

localized, the greater problems of the nature of life itself and of an individual's relation to the universe — existential problems — are not localizable. There will in fact be no such ultimate thing as 'Sirian religion' except in the ethnographic sense. To speak of a 'Sirian' God will get us into deep waters. What do we mean when we speak of a 'Jewish' God or a 'Christian' God? There is no doubt that it is at the level of our deepest concerns — our religious and philosophical ones — that contact with an extraterrestrial civilization will make its deepest impact on us. And it is at this friable level of our preconceptions that we are most vulnerable. Here the foundations of our beliefs can crumble with the first shock wave. Here the entire edifice of our civilization can give way. Only by being prepared can we safeguard our own cultural integrity.

It is obvious from the accounts of the different Nommos which are preserved by the Dogon that many elements of both Christianity and earlier Mediterranean mystery-religions appear to be present at the very heart of Dogon religion. A closer examination reveals that the Sacrificed Nommo's body (that is, the body of O Nommo; perhaps the 'O' describing this Nommo is remembered from the name Osiris as its first syllable) was dismembered in a manner reminiscent of Osiris: it was divided into twenty-two parts and each clan (*hina*) in Dogon society corresponds to a particular part of that body. It cannot be emphasized too strongly of the Dogon that in their religion they worship 'the supreme God, Amma [presumably originally Amun/Ammon], the creator of the universe', and although there are many cults, 'all the cults, no matter what their specific nature, address themselves to the god Amma.' The fact that the Dogon religion features a crucified and resurrected saviour from Sirius simply cannot be ignored. The different 'clans' even partake of his Body.

We should begin to realize that when we eventually come into contact with intelligent beings from other worlds, we shall have to revise our cherished religious ideas in order to accord with a truly cosmic perspective and break out of our parochial point of view. The Dogon have already done this. But it may be that we should take to heart the inspired words of Maurice Arthur Ponsonby Wood, the former Bishop of Norwich, which he spoke on the floor of the House of Lords: 'I believe that Christ has not only a terrestrial significance, but literally a galactic significance. It is good that our minds and eyes should be stretched further out into the regions of outer space because I do not believe that at any point of the universe we get beyond the hand of God.'<sup>79</sup>

Upon reflection over the years, I have thought that perhaps the Dogon are descended from a fundamentalist religious group of ancient Egypt who fled westwards to the Oasis of Siwa (site of the famous Oracle of Ammon, from whom the name of Amma would thus prominently survive amongst them) when compromises were being made by some pharaoh in the essentials of the Egyptian religious tradition (or perhaps on the occasion of an invasion of Egypt by 'heathen' conquerors). In this, the Dogon would have resembled the Jews, who were not prepared to compromise the essentials of their religious tradition, and were forever fleeing from pogroms and persecution rather than surrender their identity and beliefs. Previously I thought of the Dogon, despite their preserving some Egyptian traditions, as descendants of the Minyans. We should remember that the Dogon are monotheistic.

If we wish to preserve the integrity of the human race in the face of cosmic wisdom, with its overwhelming superiority to our own because of its longer duration and superior knowledge and technology — and presumably its insights — we must give some thought to how the human race can survive the blows to its pride and the challenge to its

## THE SIRIUS MYSTERY

parochial religious convictions. We live at a time when religious fanaticism and religious fundamentalism of all the different religions seem to be alarmingly on the increase. People driven to extremes are becoming more violent, with intolerance reaching such fanatical levels that the extremist Taliban Government's ban on music in Afghanistan has resulted in canaries being strangled because they dare to sing. Such insanity is widely tolerated and sometimes even applauded. What are those of us who do not share such ridiculous views going to do about it? The fanatics of all religions have turned murderous, they bomb the rest of us and terrorize innocent people, blow up children, mutilate women without a qualm. For a religious fanatic, everything can be justified, non-believers are fit only for extermination. It has always been a trait of human nature to brand strangers who do not share one's opinions as *untersmenschen* - the notorious Nazi word for sub-humans. Why any self-respecting extraterrestrial would want to come here I cannot imagine. But suppose they do - won't it be embarrassing, like having visitors enter your house and finding - as I once did at the home of a well-known writer - milk bottles with green mould growing out of them on the milk that had been left unfinished weeks before?

To religious fundamentalists I would quote the enlightened words of Archbishop Desmond Tutu of South Africa. 'It is part of the human condition to have doubt. Without it we cannot progress. It is the basis of Christianity. Even Christ on the cross had terrible doubts.' Fundamentalists are people who try to cheat by espousing a phoney certainty. We should have the courage to have doubt, and not to run away from it.

I wrote a Foreword to the 1977 paperback edition of this book from which the following remarks are worth repeating:

What will happen when a signal really is confirmed [from another world], whether it be from Sirius or from anywhere else in space for that matter? I feel certain that the day will come when all large radio telescopes will have to be surrounded by armed guards. No one seems to have realized yet that protection will have to be given to them when they become the only points of contact between ourselves and extraterrestrial civilizations. This need will become less acute when we have radio telescopes in space or on the Moon.

Passions are certainly going to be aroused. These are largely latent at the moment because our acceptance of the existence of extraterrestrial life is still only at the intellectual level. Major developments are coming which will bring realizations to us which will be with us as long as we endure. Our future as a species is essentially at issue. What are we going to be? Demoralized wretches, dragging our inferiority complexes along behind us like great sacks of potatoes? Or are we going to summon up our courage and pride? Will we slink along in the galaxy, like weasels? Or are we going to roar? Roar out that we are men, that we may be very bizarre men, but that's what we are, and we like it? These alternatives lie before us as we consider how we are going to treat the news that a signal has been received and confirmed from an extraterrestrial civilization.

Once we have received such a signal, there will be no going back. Growing up, leaving childhood behind, are processes which cannot be reversed. At the moment, we are perilously close to losing our cosmic virginity. We are about to step forth from Eden. We have lived in Paradise and not known it. Life has been an idyll, but we have not realized it as such. Our descendants will look back to our day with awe and incomprehension as the time when we still snuggled in our great World Cocoon, wrapped in our dream.

## THE SIRIUS MYSTERY

*'A sleeper is convinced he is awake But then he really  
does awaken'*

\* \* \* \* \*

As regards what I said earlier in this chapter about the Sirians and their world, we must not dismiss such speculations as idle thinking that we will wait and see what turns up in a spaceship some day. If we are going to be coming into direct contact with amphibious extraterrestrials, we should try to get some thoughts together on their physical nature and requirements at the very least — if only to make them welcome. It is quite true, as Carl Sagan says, '... stories like the Oannes legend ... deserve much more critical studies than have been performed heretofore.'<sup>80</sup> The critical studies should be institutionalized by the governments of the major powers, and made official programmes. The resources of the governments which pour into programmes to prevent their countries being overrun by military invasions, chemical warfare, nuclear blasts, should also pour into programmes to prevent our planet as a whole being overrun by a sudden extraterrestrial contact which gives little warning. No matter how much care may be taken by any superior extraterrestrial civilization in dealing with us, it is really up to us to be ready for any contact. I would even venture that we may be under observation or surveillance at this very moment, with an extraterrestrial civilization whose home base is the Sirius system monitoring our development to see when we will *ready ourselves* for their contacting us. In other words, we may very possibly be allowed to control the forthcoming contact ourselves.

One wonders what any possible amphibious extraterrestrials living at Sirius would think roughly ten years later (speed of radio transmission at speed of light — across ten light years means a ten-year lag) upon receiving news from some



## A FABLE

automatic monitoring device which picked up a radio or television programme at Earth mentioning a book just published about amphibious extraterrestrials living at Sirius. Would they think that was their cue? If what I propose in this book really is true, then am I pulling a cosmic trigger?

\* \* \* \* \*

In considering the materia set forth in this book, I hope that serious scholars will bear in mind that the existence of amphibious beings with high intelligence and advanced civilization is not a previously unheard of idea. As far back as 1966, in their book *Intelligence in the Universe*, Roger MacGowan and Frederick Ordway wrote:<sup>6</sup>

Little can be said specifically about universal physical characteristics . . . life, especially the more intelligent forms, tends to be physically small, discrete and highly mobile. Humans, being land animals, tend to think in terms of land animals when considering intelligence, but we know that the sea contains a great variety of life. Moreover, all evidence points to the conclusion that the primordial seas were probably the site of the origin of life. Oceans provide an excellent environment for animal life and the competition between many species should encourage rapid evolution.

A liquid environment provides more buoyancy and support for animal bodies than does an atmospheric gas. For this reason the marine environment may be expected to develop many species that are larger than most land animal species. Knowing that larger bodies can support larger brains one might expect to find superior intelligence among the larger marine animals.

Considering this larger potential size, the great variety of life, the good stable environment of the oceans,

and the competition among species, one is at first tempted to assume that the majority of intelligent extrasolar life would be marine. . . Fins, ideal for ocean locomotion, are not well suited to developing tools (and thereby brains) However, a few ocean species have developed other appendages more suited to tool manipulation The octopus is a very well known ocean creature which could conceivably develop tool manipulation capability with further evolution. Some other ocean floor creatures could develop the equivalent of human arms and hands

The patently high intelligence of certain whales and dolphins raises the question as to whether tool manipulating appendages are really vital to the development of superior intelligence And it makes it difficult to say whether some intelligent extrasolar life may be marine rather than land dwelling. We conclude that the majority of intelligent biological species will not differ greatly in gross morphological characteristics when compared to humans. They can be expected to range from less than half the size of a human to several times larger, and they should be expected to have, in most cases, two legs and two arms with hands and fingers. In a few cases centaur-like animals having four legs and two arms with hands and fingers, or elephant-like animals having four legs and one arm or a trunk might be possible. Another possibility is some form of marine life having fins and two short arms with large hands and webbed fingers.

In closing, I wish to make a final point of considerable importance. Let us assume that what I have proposed in this book really is true Let us grant all the premises. Say that there really is an advanced civilization based at the Sirius system No doubt we are under routine monitoring No doubt they know by now roughly where we stand on the

ladder of evolution. They have picked up our radio signals. They know we have been to the moon. Let us assume they wish us well. Let us assume even that they contact us someday when they think we are ready for it – or after we have discovered them by finding evidences of their existence.

Let us assume all this. Well, if that day comes – or if it doesn't and if some other day comes, some other civilization some day is known to us at some other star – there is one thing we must not forget. We must remember that no matter how grand and glorious *they* may be, they are still mortal beings in a universe which to them is still mysterious. They cannot and never will know all the answers. We may very well have a handful of answers that they have not. We may have some quirky skills which they cannot attain. We may have some peculiar native ingenuity which they lack, even if this is not obvious for centuries. There may be something about us that is so valuable that we are not just worthless primitives beside them. One of my pet theories is that Earth has one unique contribution to make to the galaxy: its classical music. Let us never accept a view of ourselves as recipients of cosmic charity. We are men, and for all our faults, we have a few things about us which are worth some attention. We have had some remarkable characters in our history and we will have more. Whatever one's views of what lies beyond death – extinction, reincarnation, heaven and hell – the genetic stream goes on. There will be more men, and there will be great ones. We can rise to challenges. We have demonstrated courage throughout our history. Any superior civilizations may have even more superior civilizations behind them of whom they are curious. Let us not forget the principles of hierarchy, let us never blind ourselves to the possibility of a door behind the door behind the door. And if we ever find ourselves oppressed, let us be certain that there are others – somewhere – who would free us. The universe is finite but unbounded. There are between ten and a hundred million

## THE SIRIUS MYSTERY

intelligent civilizations in our galaxy alone, in all likelihood. And there is always one more to contact than the one we have already contacted.

### Notes

- The reader may wonder if the name of the Dogon tribe is in any way connected with the names 'Dagon' and 'Odacon'. This is pure speculation but not unlikely in my opinion.
- 2 See Appendix III, for reference.
- 3 With I. S. Shklovskii, Dell, New York, 1966. See Chapter 33.
- 4 For instance, by Kenneth Demarest in *Consciousness and Reality*, p. 351.
- 5 See end of Appendix III and the Bibliography. Thomas Stanley in his *The History of the Chaldaean Philosophy*, London, 1662, p. 12, notes some additional interesting information about the family of Berossus by telling us 'A daughter of this Berossus is ment on e by Justin Martyr, a Babylonian Sybil who prophesied at Cumae. On p. 10 Stanley describes Berossus as the man who first introduced Chaldaean learning into Greece'.
- 6 'Isis and Osiris' Loeb edition, p. 149.
- 7 Hesiod, *The Theogony*, 233, translated by Hugh G. Evelyn-White, Loeb Classical Library No. 57, Harvard University Press, 1982 (originally printed 1914), p. 97.
- 8 Diodorus Siculus, *The Library of History*, Book I, 28-6, translation by C. H. Oldfather, Loeb Classical Library No. 279, Harvard University Press, 1968, p. 93 and note 5.
- 9 See Apollodorus, III, 14, 1 and Hyginus, 164. See footnotes 16 and 17 in entry for Erechtheus in the Daremberg-Saglio mythological lexicon.
- 10 Diodorus Siculus, op. cit., Book I, 29, pp. 93-4.
- 11 Hesiod, op. cit., p. 263 (Fragment 13 of the lost work *The Greek Epics*, preserved by the scholast on Apollonius Rhodius).
- 12 Plutarch, 'Isis and Osiris' (368 E), translated by Frank Cole Babbitt, in Vol. V of *Plutarch's Moralia*, Loeb Classical Library, Harvard University Press, 1962, p. 107.
- 13 See entry for Triton in Daremberg-Saglio, op. cit., footnote 10 referring to Escher.
- 14 Monier-Williams, Sir Monier, *A Sanskrit-English Dictionary*, new edition, Oxford, 1899, p. 46, column c.
- 15 Ibid.
- 16 Temple, Robert K. G., *He Who Saw Everything: A Verse Translation of*

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- the Epic of Gilgamesh*, Rider, London, 1991, pp. 93-5 (Notes to Tablet X)
- 17 Hesiod, *op. cit.* 930; p. 149.
- 18 Daremberg-Saglio, *op. cit.*, entry for Typhon. The translation from the French is by Olivia Temple.
- 19 *Ibid.*
- 20 *Ibid.*, entry for Typhon. Translation by Olivia Temple.
- 21 Hesiod, *op. cit.* 205-326, pp. 101-3.
- 22 Plutarch, *op. cit.*, 37c (see also 356a). p. 133 (see also p. 35). Plutarch calls the Elder Horus 'Arcturus' and says he was the Greek Apollo, conceived by Isis and Osiris when they were still in the womb together!
- 23 James Legge, *The Yi King*, Oxford, 1882, p. 11.
- 24 This is from the beginning of the second chapter of Part Two of the Great Appendix. The translation is essentially that of Joseph Needham in *Science and Civilisation in China*, Vol. II, Cambridge, 1956, p. 326. In quoting from Needham I take account of the now more common Pinyin transliterations.
- 25 Legge, *op. cit.* p. 14.
- 26 Joseph Needham, *Science and Civilisation in China*, Vol. III, Cambridge, 1959, p. 22 (spelling of Fuxi adapted to Pinyin).
- 27 Needham, *op. cit.*, III, p. 213.
- 28 *Ibid.*, p. 22.
- 29 Allen, Herbert J., trans. and commentator. *Ssuma Ch'ien's Historical Records*, in *Journal of the Royal Asiatic Society*, London, April, 1894-July, 1895, pp. 269-74. In my quotations I have modernized the spelling to Pinyin.
- 30 Derk Bodde, 'Myths of Ancient China', in Samuel Noah Kramer, ed., *Mythologies of the Ancient World*, Anchor Books, New York, 1961, p. 388.
- 31 *Ibid.* p. 398.
- 32 *Ibid.*, pp. 399-400.
- 33 Verne Dyson, *Forgotten Tales of Ancient China*, Shanghai, 1927, p. 286.
- 34 Hopkins, L. C., 'Dragon and Alligator: being notes on some Ancient Inscribed Bone Carvings', in *Journal of the Royal Asiatic Society*, July, 1913, pp. 345-52 and Plates I-III.
- 35 Hopkins, L. C., 'The Dragon Terrestrial and the Dragon Celestial: Part II. The Dragon Celestial', in *Journal of the Royal Asiatic Society*, January, 1932, pp. 91-7.
- 36 Chan Ping-leung, 'A Study of the Flood Myth of the Yao People: A Comparative Approach', in Chan Ping-leung et al., eds., *Essays in Commemoration of the Golden Jubilee of the Fung Ping Shan Library (1932-1982)*, Hong Kong, 1982, p. 156.

# THE SIRIUS MYSTERY

- 37 J. J. M. de Groot. *The Religious System of China*, Taipei: reprint, 1976, Vol. V pp. 529-30
38. Needham, op. cit., I, p. 163
- 39 G. W. Loughby-Meade, *Chinese Ghosts and Goblins*, London, 1928, p. 143
- 40 *Le Renard pâle*, p. 462
- 41 Ibid. p. 458
- 42 Ibid. p. 460.
- 43 Ibid. p. 440.
44. Ibid. p. 44.
- 45 Ibid p. 44.
46. Ibid p. 440.
- 47 Ibid. p. 440
48. Ibid p. 440.
- 49 Ibid pp 309-10.
- 50 Ibid., pp 309-10
51. Ibid., pp. 156-60.
52. Ibid., pp. 156-60.
53. Ibid pp. 156-60.
- 54 Ibid , pp 156-60.
55. Ibid., pp 157-60.
56. Ibid., pp 157-60.
- 57 Ibid., p. 287
58. Ibid., p. 287
- 59 Ibid., p. 444
60. Ibid., pp. 444-5.
- 61 Ibid., pp. 444-5.
- 62 Ibid., pp. 444-5.
- 63 Ibid., pp 444-5
64. Ibid., p. 506
- 65 Ibid., p. 439
66. Ibid p. 438.
- 67 Ibid pp 437-9
68. Ibid , p.436.
- 69 Ibid , pp. 436-9
- 70 Ibid , p.474
- 71 *The Marsh Arabs*, by Wilfred Thesiger, Penguin Books London, 1967 and originally Longmans Green, London 1964
- 72 Temple, *He Who Saw Everything*. op. cit pp 119-20.
73. *Le Renard pâle*, p. 370.
- 74 I may be entirely wrong with this supposition, according to a report on the bottlenosed dolphin in *Science*, Vo. 189, no. 4203, 22 August 1975, pp.

650-2 There, four joint authors from the University of Hawaii show that this dolphin has a special double-slit pupil which enables it to see very well at long distances in air. The conclusion is that 'daylight visual resolution acuity of the bottlenosed dolphin, *Tursiops truncatus* is approximately equally good in air and water'.

75. Tighe, Chris, 'Scientists Tune into Teeth of Dolphins', *Daily Telegraph* London, 28 November 1989.

76. See for instance 'Mermaid' Beast Faces Extinction in Dead Sea of Oil' in the *Daily Telegraph*, London, 28 January 1991, p. 3.

77. Reuters report, 'Legend Lives on as Surveys Find Dugong Is Flourishing' in the *Daily Telegraph*, London, 3 July 1990.

78. 'Science Report Zoology: The Age of a Dugong', in *The Times*, London, 1 April 1976; source *Biological Conservation*, 9, 2, 25 (1975). Despite the date, this was not an April Fool story.

79. These remarks have been inserted for the new edition (1997). I reported the remarks of the Bishop of Norwich which took place in a debate to which I listened personally in the magazine *Second Look* which I once co-edited. Temple, Robert K. G., 'House of Lords Debate UFOs' *Second Look*, Washington, DC, Vol. I, No. 6, April 1979, pp. 17-28, for the Bishop, see p. 21. The next summer (1980) I attended a Garden Party at Buckingham Palace and saw the Bishop of Norwich, so went up to him and chatted about this matter. He repeated his sentiments with great fervour. I believe he retired as Bishop of Norwich sometime in the 1990s.

80. Sagan and Shklovski: op. cit., p. 461 (It is not true, as he says on p. 460, the previous page, that the idea of planets circling stars is an idea which essentially originated with Copernicus, as anyone reading Appendix II will see.)

81. MacGowan, Roger, and Ordway, Frederick, *Intelligence in the Universe*, Prentice-Hall Inc., New Jersey, U.S.A. 1966, pp. 242-4.

## APPENDIX I

# A Sudanese Sirius System

*by*

*M. Griaule and G. Dieterlen*

*Note* The following article is translated and published in its entirety. It is written for professional anthropologists and ethnographers, and is presented here for the reader who is sufficiently interested in the subject to wish to pursue the source material. It is, therefore, supplementary information, and is not essential for the reader who merely wishes to follow the argument.

## FOREWORD

The indigenous knowledge about the Sirius System which is set forth in this chapter has been gathered from four Sudanese peoples: the Dogon in Bandiagara, the Bambara and the Bozo in Segou<sup>1</sup> and the Minianka in Koutiala.

The main investigation was carried out among the Dogon



## APPENDIX I

between 1946 and 1950, where the four major informants were

*Innekouzou Dolo*, a woman aged between sixty-five and seventy, *ammayana* priestess of Amma', and soothsayer, living in the Dozyou Orey quarter of Ogol-du-Bas (Lower Ogol), Sanga-du-Haut (Upper Sanga). Tribe: Arou Language Sanga

*Ongnonlou Dolo*, between sixty and sixty-five years old, patriarch of the village of Go, recently established by a group of Arou in the south-west of Lower Ogol Language Sanga

*Yébéni*, fifty years old, priest of the Binou Yébéne of Upper Ogol, living in Bara (Upper Sanga). Tribe: Dyon. Language Sanga

*Manda*, forty five years old, priest of the Binou Manda, living in Orosongo in Wazouba Tribe: Dyon. Language Wazouba

The system as a whole was expounded by Ongnonlou, its various details by the other informants. Although he was not responsible for drawing up the Sigui calendar, Ongnonlou was acquainted with the principles behind it and, during the periods when the investigators were there, was able to obtain further information from the Arou at Yougo Dogorou on the one hand and, on the other, from the permanent steward of the supreme chieftain of the Arou at Arou-by-Ibi.<sup>2</sup> Ongnonlou is in fact patriarch of the family from which the next holder of the title will be designated when the next holiday comes around.

Ongnonlou's learning, within an extremely secret body of knowledge, thus represents an initial acquaintance or, to use a Bambara expression, a 'slight acquaintance', and this point should be kept in mind. Just as, for the layman, the star Sirius is the brightest star in the sky, attracts his gaze, and plays the major role in the computation of the Sigui, so the rules of the Sirius system as revealed to the initiated in the first instance are at once simplified in some parts and complicated in

others, so as to divert the attention from calculations which are more secret by far.

It must therefore be understood, once and for all, that the system described here represents one phase of the revelations permitted to initiates who are top-ranking but not specifically responsible for the calculations to do with this part of the sky.

For our part, the documents gathered together have not given rise to any original hypothesis or research. They have been simply pieced together in such a way that the accounts of the four principal informants are merged into one and the same statement. The problem of knowing how, with no instruments at their disposal, men could know the movements and certain characteristics of virtually invisible stars has not been settled, nor even posed. It has seemed more to the point, under these special circumstances, to present the documents in the raw.

### THE CALCULATION OF THE TIME OF THE SIGUI

Every sixty years<sup>3</sup> the Dogon hold a ceremony called the Sigi (ceremony). Its purpose is the renovation of the world, and it has been described at length by them in 1931.<sup>4</sup> Since the beginning of this investigation, we were faced with the question of determining the method used to calculate the period separating two Sigi ceremonies. The common notion, which dates back to the myth of creation, is that a fault in the Yougo rock, situated at the centre of the village of Yougo Dogorou,<sup>5</sup> lights up with a red glow in the year preceding the ceremony. This fault contains various altars, in particular busts of Andoumboulou (the name given to the people of small stature who formerly lived in the rocks), and a rock painting called *amma bara*, 'god helps', to which we shall refer later. Furthermore, and before this red glow appears, a spot situated

outside the village becomes covered with elongated gourds of a type which no one would have sown.

When these signs are observed, an apparently simple procedure of calculation is carried out, solely by the people of Yougo Dogrou who belong to the Arou tribe.<sup>5</sup> The council of elders assesses the interval by means of thirty two-yearly drinking bouts when beer made from mullet is drunk, and the eldest elder marks up each bout with a cowrie shell.

These bouts are held about one month before the first rains, sometimes in May or June, in a tent or shelter pitched to the north of the village centre.<sup>7</sup> But this rule is only theoretical: between the last Sigui, celebrated at the beginning of the century, and 1931<sup>8</sup> there has been only one bout halfway through the period, but the two-yearly cowries were set down and gathered into a pile representing the first thirty years. From 1931 onwards, the drinking bouts took place every two years. When the second pile consisting of fifteen cowries has been collected, the second Sigui of the twentieth century will be celebrated.<sup>9</sup>

According to Manda, the priest, the calculation of the Sigui is recorded above the door of the sanctuary of Binoi by two figures made of mullet pulp representing the god Amma and his son, Nommo, Instructor of the new world.<sup>10</sup> The first consists of a vertical oval – the egg of the world – and its major axis, Amma in the original darkness. In the right-hand half, each year is marked with a dot, starting from the bottom. When the seventh year comes round, a kind of trident is drawn on the outside, as an extension to the line of dots. The same thing is done on the left-hand side, in the order top-to-bottom. Fourteen years are counted in this way: the seven twin years during which the world was created, and to which a unit, symbolizing the whole, is added.<sup>11</sup> Diagrammatically speaking, the figure shows the god's last gesture, raising one hand and lowering the other, thereby showing that sky and earth are made.

This drawing is repeated four times, making it possible to reckon a period of sixty years; it is accompanied by the figure of the Instructor,<sup>12</sup> composed of two vertical legs supporting a head atop a long neck. During the first thirty years which are recorded by two ovals, the figure features only the right leg. During the second thirty-year period, the left leg is made a little longer each year in such a way that when the *Sigui* actually occurs it is the same length as the right leg. It is by allusion to this figure that people talk about the *Sigui* 'getting to its feet' during this latter period.

### THE CALCULATION OF THE SIGUI CEREMONIES

When it is time for the *Sigui*, the elders gathered in the *sána tone* shelter at Yougo draw a symbol on the rock with red ochre (Figure 1), which represents a *kanaga* mask,<sup>13</sup> this, in turn, represents the god Amma: a hole is made in the ground below it symbolizing the *Sigui* and thus Amma in the egg of the world. In effect these two signs should be 'read' in the opposite order: Amma, in the shadow of the egg (the hole) reveals himself to men (the red design) in his creative posture (the mask depicts the god's final gesture, showing the universe.)<sup>14</sup>

The hole is also interpreted as the hole which must be dug to put seeds in. From this viewpoint the holes are arranged in series of three, connoting three *Siguis* placed respectively beneath the sign of three seeds, after which they are named. Thus the *Sigui* at the beginning of this century was called *emma sigi*, the 'sorghum *Sigui*', the next one will be called *ya sigi*, the 'millet *Sigui*', and the one after *nu sigi*, the 'haricot *Sigui*'.

In theory, then, it would seem possible to record the *Siguis* using this simple method. In practice, the holes



Figure 1. \* The *Kanaga* sign, connoting the sixty year ceremonies, at Yougo Dogorou (indigenous painting)

become obliterated and the painting, more often than not, is touched up instead of being reproduced and thus forming part of a countable series. But there is another figure painted on the façade of the sanctuaries which reveals rather more specific data, it is called *sigi tugu*, 'calculation of the Sigi', and consists of a line of vertical chevrons, the notches of which are painted alternately black, red, and white, each colour corresponds to a seed – the first to millet, the second to the haricot and the third to sorghum (figure 11). This line can be read in two ways. Either by using just one counting system (for example the left-hand one), whereby each notch is the equivalent of twenty years, here the notch upon which a Sigi actually falls is carried over to the following series, or, by taking the whole figure and counting twenty years for each notch, regardless of its positioning (the right column in figure 11); here, the notch upon which a Sigi falls is recounted.

More consistent evidence of the celebration of the Sigi

\* As this is a direct translation of the entire article, I have kept the authors' numbering for their diagrams. My numerical sequence of figures recommences in Appendix IV.

## THE SIRIUS MYSTERY

is provided by the large wooden mask, whose carving is one of the major concrete purposes of the ceremony. This mask, usually of considerable size<sup>15</sup> – is seldom used, and is kept in some shelter or hideaway in the rocks, along with those which have been carved at previous ceremonies. The care with which these masks are treated – for in some ways they are the village archives – means that it is not uncommon to come across series of three or four of them, the oldest of which date back, respectively, to 1780 and 1720,<sup>16</sup> give or take a year or two. In exceptional cases, when the shelter has been well selected and under constant surveillance, the series may be longer still, thus at Ibi, in 1931, nine poles were counted, and these must have succeeded three more which had been reduced to a few fragments and piles of dust and were still visible; as were the special places earmarked for them at the back of the shelter, all perfectly protected from the damp, vermin and animals. The oldest in the series of nine, which showed a continuous progression of ageing in the course of time,<sup>17</sup> thus date from the beginning of the fifteenth century, and if the three others are taken into account, the remnants of the earliest would date back to the first half of the thirteenth century.<sup>18</sup>

It is not easy to come across material evidence dating back further than the traces of these poles at Ibi. But there is another object, existing in a single edition, which is fashioned during these Sigai ceremonies and which might also be a significant milestone in the calculation process. With the festival in mind each regional Hogon as well as the supreme Hogon of Arou, has a fermentation stand woven out of baobab fibres, this stand is used during the preparation of the first ritual beer. This beer is distributed in small quantities to each family, it is then added to everybody's cup, and thus ensures the homogeneousness of the beer drunk by the community. In addition to this, all the other fermentation stands are associated, by contact, with the

# APPENDIX I

principal one, which is exceptionally large the lid measures 40 cm (16 in) in diameter, and the four 'pompoms' are the size of the normal object. As a result, it can only enter the large jars.

These objects are kept in the Hogon's house where they are hung from the main beam, and thus form a permanent sequence. Ongnonlou saw six or seven of them in the official residence of the Hogon of Sanga, the latter, one of the oldest men in Dogon country, has it that his great-great-grandfather had seen eight others which preceded the oldest in the

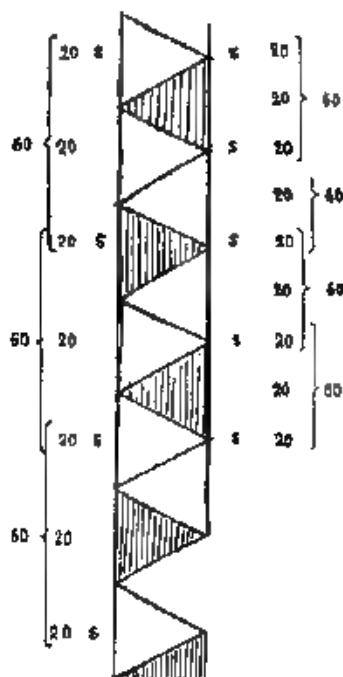


Figure 11 The calculation of the Siga

present series.<sup>19</sup> Assuming a total of fourteen objects for the Sanga chieftainry, the first – which almost certainly does not denote the first ceremony held in this region – would have been woven in the twelfth century, if one reckons on the period separating two *Siguis* being sixty years.

Again, Ongnonlou counted a series of eight in the house of the supreme Hogon of the Arou, at Arou-by-Ibi. But he adds that the number 'should' be twenty-four, although he cannot explain if there is an ideal series which a complete sequence would aim for, or which, conversely, would correspond to reality if the fibres had not turned to dust.<sup>20</sup>

The methods described above for both keeping track of the ceremonies and for calculating the intervals between *Siguis* are simple and tend to be mnemotechnic. For the initiate they simply act as understudies for other more complex practices and knowledge to do with the Sirius system. The Dogon names for this star – *sigi tolo*, star of the *Sigui*,<sup>21</sup> or *yasigi tolo*, star of *Yasigui*<sup>22</sup> – sufficiently indicate its relation with the ceremony of the renovation of the world which takes place every sixty years.

Sirius, however, is not the basis of the system. It is one of the foci of the orbit of a tiny star called *Digitaria*, *po tolo*,<sup>23</sup> or star of the Yourougou,<sup>24</sup> *jurugu tolo*, which plays a crucial role and which, unaided as it were, hogs the attention of male initiates.

This system is so important that, unlike the systems of other parts of the sky – it has not been assigned to any particular group. In effect the Ono and Dommo tribes govern the stars, the former including Venus rising among its attributes, the latter Orion's belt. The sun should be assigned to the most powerful tribe, the Arou, but so as not to be guilty of excess, the Arou handed the sun over to the Dyon, who are less noble, and hung on to the moon. As far as the star *Digitaria* and the system to which it belongs are concerned, these are common to all men.



## APPENDIX I

### THE ORBIT OF DIGITARIA

The orbit described by Digitaria around Sirius is perpendicular to the horizon, and this position is alluded to in one of the most common ceremonies in which masks play a part:

*laba ozu po*  
*ozago po ya*  
(the path of the mask (is) straight (vert.cal)  
this path runs straight)

But if one takes the pun into account – familiar to the initiated between *po*<sup>25</sup> 'straight' and *po* Digitaria, the translation becomes:

the path of the mask (is the star) Digitaria  
the path runs (like) Digitaria.

A figure made out of mullet pulp (fig. iii) in the room with the dais in the house of the Hogon of Arou gives an idea of this trajectory, which is drawn horizontally: the oval (lengthwise diameter about 100 cm. = 40 in.) contains to the left a small circle, Sirius (S), above which another circle (DP) with its centre shows Digitaria in its closest position. At the other end of the oval a small cluster of dots (DL) represent the star when it is farthest from Sirius. When Digitaria is close to Sirius, the latter becomes brighter, when it is at its most distant from Sirius, Digitaria gives off a twinkling effect, suggesting several stars to the observer.<sup>26</sup>

This trajectory symbolizes excision and circumcision, an operation which is represented by the closest and furthest passage of Digitaria to Sirius. The left part of the oval is the foreskin (or clitoris), the right part is the knife (fig. iv).

This symbolism is also expressed by a figure used for

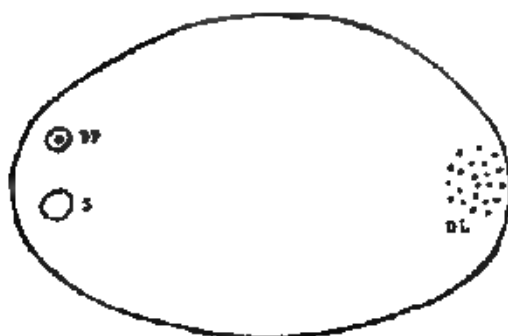


Figure iii. The trajectory of the star Digitaria around Sirius

other performances<sup>27</sup> (fig. v) A horizontal figure rests on a vertical axis which connects two circles: S (Sirius) and D (Digitaria); the centre of the figure is a circle T, which represents the trajectory of D. The line E is the penis, the hook B'

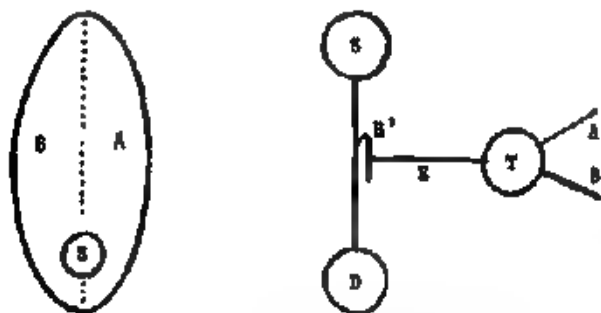


Figure iv. The symbolism of the trajectory of Digitaria. S: SIRIUS, A: knife, B: foreskin.

Figure v. The symbolism of Digitaria. S: SIRIUS, D: Digitaria, T: trajectory of Digitaria, A: knife, E: penis, B and B': foreskin

the foreskin. Two horns hinge on the circle and reproduce once again the two parts of the trajectory (cf. fig. 14). A, the knife; B, the foreskin. Thus the Sirius system is associated with the practices of renovating people, and, consequently, in accordance with the Dogon mentality — with the ceremonies which celebrate the renovation of the world.

The period of the orbit is counted double, that is, one hundred years,<sup>28</sup> because the Sigiis are convened in pairs of 'twins', so as to insist on the basic principle of twin-ness.<sup>29</sup> It is for this reason that the trajectory is called *mumu*, from the root *monye* 'to reunite', from which the word *muno* is derived, which is the title given to the dignitary who has celebrated (reunited) two Sigiis.

According to Dogon mythology, before the discovery of Digitaria the supreme chief was sacrificed at the end of the seventh year of his reign (the seventh harvest). This was the only computation known about, the year-unit had not then been established. The spiritual and material principles of the victim were conveyed to Digitaria — to regenerate the victim whose existence was known but whose features had not been revealed to man, because the star was invisible.

Thus was the rule for forty-nine years for the first seven chiefs who thus nourished the star, and enabled it to renovate the world periodically. But, having discovered the star, the eighth chief resolved to avoid the fate of his predecessors: with his son's complicity, he feigned death, lay dormant for a few months and reappeared before the chief who had succeeded him, he announced that he had been to Digitaria, knew its secrets, and that, from then onwards, every Hogon would reign for sixty years — the period which would later separate one Sigiur from the next.<sup>30</sup> Restored to office, he raised the level of the sky which, hitherto, had been so close to the earth that it could be touched,<sup>31</sup> and he completely revised the method of calculating time, and the method of reckoning

Until that time the ceremonies celebrating the renovation of the world had in fact taken place every seventh harvest,<sup>32</sup> the Hogon made his calculations on the basis of five-day periods, a unit which established the week as it still is today, and five harvest cycles. And as he was eighth in line, he counted eight cycles, in other words forty years, and the number forty became the basis for computation: the month had forty days, the year forty weeks (of five days each). But the Hogon lived sixty years, a number which was interpreted as the sum of forty (basis of calculation) and twenty (the twenty fingers and toes, symbolizing the person and thus, in the highest sense of the word, the chief). Thus sixty became the basis for calculations<sup>33</sup> and it was first applied to establish the period of time separating two *Siguis*. Although the orbit of *Digitaria* takes approximately fifty years and although it corresponds to the first seven reigns of seven years respectively, it none the less computes the sixty years which separate two ceremonies<sup>34</sup>.

As well as its movement in space, *Digitaria* also revolves (rotates) upon itself over the period of one year and this revolution is honoured during the celebration of the *bado* rite. On this occasion it ejects from its three spirals the beings and the things which it contains. This day is called *badyu*, 'sur y father', because it is marked by a general movement of the world which upsets people and places them in an unsure relationship with themselves and with each other.

## THE ORIGINS AND FEATURES OF DIGITARIA

The eighth Hogon instructed his people in the features of the star, and, more generally, of the Sirius system.

Sirius appears red to the eye, *Digitaria* white. The latter lies at the origin of things. 'God created *Digitaria* before any

other star' <sup>35</sup> It is the 'egg of the world', *aduno tal*, the infinitely tiny and, as it developed it gave birth to everything that exists, visible or invisible <sup>36</sup> It is made up of three of the four basic elements: air, fire and water. The element earth is replaced by metal. <sup>37</sup> To start with, it was just a seed of *Digitaria exilis*, <sup>38</sup> *pō*, called euphemistically *kise uzi*, 'the little thing', <sup>39</sup> consisting of a central nucleus which ejected ever larger seeds or shoots in a conical spiral motion (fig. vi) The first seven seeds or shoots are represented graphically by seven lines, increasing in length, within the sac formed in turn by an ova, symbolizing the egg of the world

The entire work of *Digitaria* is summarized in a drawing whose various parts are carried out in the following order <sup>40</sup> a vertical line issues from the ova. the first shoot to emerge from the sac, another segment, the second shoot, takes up a crosswise position and thus supplies the four cardinal points the stage of the world The straightness of these two segments symbolizes the continuity of things, their perseverance in one state Last, a third shoot, taking the place of the first, gives it the form of an oval which is open in its lower section, and surrounds the base of the vertical segment The curved form, as opposed to the straight, suggests the transformation and progress of things The personage thus obtained, called the 'life of the world' is the created being, the agent, the microcosm summarizing the universe

In its capacity as the heavy embryo of a world issued each year, *Digitaria* is represented in Wazouba either by a dot or by a sac enveloping a concentric circle of ten dots (the eight ancestral Nommos and the initial couple of Nommo) Its continual movement produces beings whose souls emerge at intervals from the dots and are guided towards the star Sorghum <sup>41</sup> which sends them on to Nommo. This movement is copied by the rhombus which disperses the creation of the Yourougou in space Six figures are arranged around the circle, as if ejected from it (fig. vii): <sup>42</sup>



*Figure 21* The origin of the spiral of creation (andogenous drawing actual size)

a two-pronged fork trees,  
 a stem with four diagonal lines, small millet,  
 four dots arranged as a trapezium, cow with its head  
 marked by a short line;<sup>43</sup>  
 four diverging lines starting from the base of a bent  
 stem domestic animals,  
 four dots and a line wild animals;  
 an axis flanked by four dots, plants and their foliage<sup>44</sup>

The original work is likewise symbolized by a filter basket made of straw called *nun goro*, 'bean cap'. This utensil consists of a sheath in the form of a continuous helical spiral, the centre of which starts at the bottom.<sup>45</sup> The spiral supports a network of double radii.<sup>46</sup> The spiral and the helix are the initial vortical motion of the world; the radii represent the inner vibration of things.

Originally, then, Digitaria is a materialized, productive motion. Its first product was an extremely heavy substance which was deposited outside the cage of movement represented by the filter basket.<sup>47</sup> The mass thus formed

# APPENDIX I

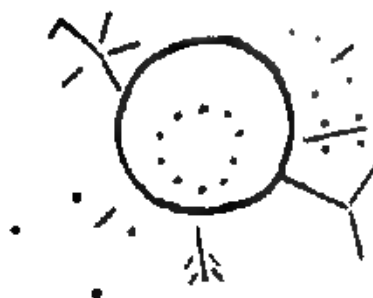


Figure vii. The star *Digitaria* (indigenous drawing actual size<sup>50</sup>)

brought to mind a mortar twice as big as the ordinary utensil used by women.<sup>48</sup> According to the version told to the men, this mortar has three compartments: the first contains the aquatic beings, the second, terrestrial beings, and the third, the creatures of the air. In reality the star is conceived of as a thick ova, forming a backcloth from which issues a spiral with three whorls (the three compartments)

According to the version instructed to the women, the compartments are four in number and contain grain, metal, vegetables and water. Each compartment is in turn made up of twenty compartments; the whole contains the eighty fundamental elements.

The star is the reservoir and the source of everything: 'It is the granary for everything in the world.'<sup>49</sup> The contents of the star-receptacle are ejected by centrifugal force in the form of infinitesimals comparable to the seeds of *Digitaria exilis*\* which undergo rapid development. 'The thing which goes (which) emerges outside (the star) becomes as large as it every day.'<sup>51</sup> In other words, what issues from the star increases each day by a volume equal to itself.

\* See Figure 1 earlier in this book.

## THE SIRIUS MYSTERY

Because of this role, the star which is considered to be the smallest thing in the sky is also the heaviest. 'Digitaria is the smallest thing there is. It is the heaviest star'<sup>52</sup> It consists of a metal called *sagata*,<sup>53</sup> which is a little brighter than iron and so heavy 'that all earthly beings combined cannot lift it' In effect the star weighs the equivalent of 480 donkey-loads<sup>54</sup> (about 38,000 kg. = 85,000 lb.), the equivalent of all seeds, or of all the iron on earth,<sup>55</sup> although, in theory, it is the size of a stretched ox-skin or a mortar

### THE POSITION OF DIGITARIA

The orbit of Digitaria is situated at the centre of the world, 'Digitaria is the axis of the whole world,'<sup>56</sup> and without its movement no other star could hold its course. This means that it is the master of ceremonies of the celestial positions, in particular it governs the position of Sirius, the most unruly star; it separates it from the other stars by encompassing it with its trajectory

### OTHER STARS IN THE SIRIUS SYSTEM

But Digitaria is not Sirius's only companion. the star *enne ya*, Sorghum Female, is larger than it, four times as light (in weight), and travels along a greater trajectory in the same direction and in the same time as it (fifty years). Their respective positions are such that the angle of the radii is at right angles. The positions of this star determine various rites at Yougo Dogorou. Sorghum Female is the seat of the female souls of all living or future beings.<sup>57</sup> It is euphemism that describes them as being in the waters of family pools. the star throws out two pairs of radii (beams) (a female figure) which, on reaching the surface of the waters, catch the souls.



# APPENDIX I



Figure vii The star of women



Figure ix The star Sorghum-Female

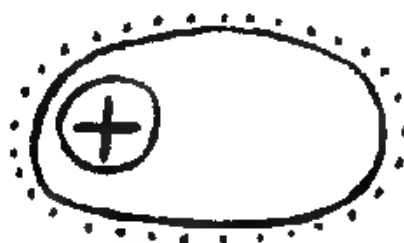


Figure v The Sorghum-Female system

It is the only star which emits these beams which have the quality of solar rays because it is the 'sun of women', *nyān nay* 'a little sun', *nay dagi*. In fact it is accompanied by a satellite which is called the 'star of Women', *nyān tolo*, or Goatherd, *enegmin* (literally goat-guide), a term which is a pun on *emme girin* (literally sorghum guide). Nominally then it would be more important as the guide of Sorghum-Female. Furthermore, there is some confusion with the major star, the Goatherd, which is familiar to everyone.

The star of women is represented by a cross,<sup>58</sup> a dynamic

## THE SIRIUS MYSTERY

sign which calls to mind the movement of the whole Sirius system (fig. viii).

Sorghum-Female is outlined by three points, a male symbol of authority, surrounded by seven dots, or four (female) plus three (male) which are the female soul and the male soul (fig. ix).

Taken as a whole, the Sorghum-Female system is represented by a circle containing a cross (the four cardinal directions), whose centre consists of a round spot (the star itself) and whose arms serve as a receptacle for the male and female souls of all beings. This figure, called the 'Sorghum-Female pattern', *emme ya tônu*, occupies one of the centres of an ellipse called 'the pattern of men', *anam tônu*, consisting of a full line called the 'goatherd's course' *enegwim ozu*, flanked by two dotted lines, the outside of which is the path of the male souls, and the inside the path of the female souls (fig. x).

The Sirius-Digitaria-Sorghum system is represented by a 'pattern of the Sign', *sigi tônu*, consisting of an oval (the



Figure xi. The course of the stars of the Sirius system

world) in which one of the centres is Sirius. The two alternate positions of Digitaria at the time of the Sigui are marked and the positions at the same moment of Sorghum-Female are marked on two concentric circles encompassing Sirius.

The Sirius system as a whole is drawn at Sanga in different ways, in particular at the *bado* ceremony. On the façade of the residence of the great Hogon of Aroa and inside the official houses assigned to the Hogons of Dyon, the course of these stars is represented by 'the pattern of the master of the star of the Shoemaker', *djan tolo bana tonu* (fig. x) composed of a vertical axis supporting, two-thirds of the way up, a bulge, Sirius (S), and broken at its base to form an elongated foot jutting to the left at right-angles, the course of the star of the Shoemaker (C). It is topped by a semi-oval whose arms extend quite low down, the meeting-point (D) with this oval symbolizes Digitaria, whose course is traced by the right arm (F). But this arm is also the star of women whilst the left arm is Sorghum-Female (E). The lower part of the axis (SC), longer than the upper part (SD), reminds one that the Shoemaker (C) is farther than Sirius is from the other stars, and revolves in the opposite direction.

Thus it is that during the *bado* ceremony the oldest woman of the family draws, at the entrance to the house, the 'pattern of the world of women', *nyān aduno tonu*,<sup>59</sup> or 'pattern of the top and bottom of the world', *aduno dale donule tōnu* (fig. xi).

It consists of an oval, the egg of the world, containing nine signs.

*Du* - Digitaria. The open curve on the right indicates the acceptance of all the substances and matter placed in it by the Creator.

*Dh* - Digitaria in its second position. The open oval below marks the exit of the matter which spreads across the world, A and B also indicate the extreme positions of Digitaria in relation to Sirius.



Figure 211. The Sirius system

*E.* – The star Sorghum-Female, counterpart of Digitaria. As it is the 'sun of women', it is placed at the centre of the egg, like the sun at the centre of the solar system. The oval is framed by two times two small vertical lines symbolizing the rays emitted by the star

*S* – Sirius, 'star of the Sigui' or 'star of Yasigui'. The sign, so placed that it materializes the liaison worked by Sirius between the two stars described above, consists of a kind of X with one right arm – the ant, *key* – dividing a curved arm, the lower part of which is Yasigui, and the other part the piece of the organ which is detached during excision. Although female, the ant is here depicted by a straight rod, as

## APPENDIX I

if it were a man. This marks its domination of Yasigui's femininity, for Yasigui is maimed

*R* The Yourougou. A hook, made up of a circular arc and a straight segment indicates that the first movement of the Yourougou describes a curve which goes around the sky, falling short of the goal, it descended directly, as is shown by the right hand segment which is also the piece of bared placenta.<sup>60</sup>

In effect, with Digitaria as the egg of the world (see earlier) this latter was split into two twin placentas which were to give birth respectively to a pair of Nommo Instructors. What happened, however, was that a single male being emerged from one of the placentas, in order to find his twin, this being tore off a piece of this placenta, which became earth. This intervention upset the order of creation: he was transformed into an animal, the pale fox, *yuruga*,<sup>61</sup> and communicated his own impurity to the earth, which rendered it dry and barren. But the remedy to this situation was the sacrifice, to the sky, of one of the Nommo Instructors which had issued from the other placenta, and the descent of his twin to earth with life-giving, purifying rain.<sup>62</sup> The destiny of Yourougou is to pursue his twin to the end of time: the twin being his female soul at the same time. On the mythical level, Digitaria is thus considered to be the Yourougou held in space by Nommo, relentlessly revolving around Sirius, or Yasigui in other words, and never capable of reaching it.

*A* The figure of the Nommo consists of a vertical segment, Nommo in person, upon which, and slightly below the upper edge, rests a line broken into three unequal parts, the first is the seat of future female souls, the second the seat of the souls of the dead, and the third the seat of living souls.

*Fa* The star of Women, *nyan tolo*. An embryonic spiral calls to mind that it is the satellite of Sorghum Female.

*Fb* The 'sign of women', *nyan lōnu*, consists of a diagonal line, man, cut by a line which ends in a convex

## THE SIRIUS MYSTERY

curve, woman. This shows the contact between the sexes.<sup>63</sup> The rod is upright with astonishment at the sight of creation which started with the system of women. Woman is a heavy-bellied profile, ready to give birth.

*Fc* The sex of women is depicted by an oval which is open in the lower part, womb-world, ready for procreation, gaping downwards to spread the seeds.

## THE SIRIUS SYSTEM AMONG THE BAMBARA

The Bambara call Sirius 'the star of the foundation', *sigi dolo*, which is the same term used by the Dogon, and like them they call the star *Digitaria fin dolo*.<sup>64</sup> The expression *fū dolo fla*, 'the two stars of knowledge', is generally attributed to it, because 'it represents in the sky the invisible body of Faro', conceived as a pair of twins.<sup>65</sup> This name also implies that the star is the seat of all learning.

The Sirius system is depicted on the chequered blanket called *koso wala*, 'coloured picture', consisting of ten sequences made up of some thirty rectangles coloured alternately indigo and white which symbolize, respectively, darkness and light, earth and sky, and, in Bambara mythology, Pemba and Faro. Scattered throughout there are twenty-three rectangles with different patterns of small stripes placed in the direction of the thread, alternating the indigo, white and red. Twenty of them represent stars or constellations, the other three respectively represent the rainbow, hailstones and rain. The fifth sequence in the centre, in which there is no coloured rectangle, symbolizes the Milky Way. The ninth sequence, at one end, contains five black (not indigo) rectangles which point to the 'fifth creation, in darkness, which will occur with the arrival of the waters to come'.<sup>66</sup>

*Sigi dolo* is first depicted alone in the cold season and in

impurity' by the ninth rectangle (third sequence); it is next depicted flanked by *fā dolofla* (two red lines) in the fifteenth rectangle (eighth sequence).<sup>67</sup>

In Bambara mythology, Sirius represents Mousso Koroni Koundyé, twin of Pemba, maker of the earth, a mythical woman whom he chased through space and was never able to catch. In every respect Mousso Koroni Koundyé is comparable to Yasigui.<sup>68</sup> She inaugurated circumcision and excision and, as a result, Sirius is the star of circumcision, for both Bambara and Dogon alike.

### THE SIRIUS SYSTEM AMONG THE BOZO

The system is also known to the Bozo, who call Sirius *sama kayne* (literally sitting trouser) and its satellite *tono nalema* (literally eye star).

#### Notes

1. A member of the Bambara living in Bandiagara also confirmed the most important features of the system.
2. Various pieces of information were supplied direct by the people of Yougo-Dogorou in 1931, 1936, 1948, 1949 and 1950.
3. We ourselves accepted this figure in 1931 and it can safely be retained for the time being.
4. Cf. Graule, *Masques Dogons*, Travaux et Mémoires de l'Institut d'Ethnologie de l'Université de Paris, vol. xxxii (1938), chapter I.
5. *Ibid.*, pp. 167 ff., where this fault in the rock is described in detail.
6. The Dogon are divided into four tribes, each of which had a different role at one time. The four are the Arou (soothsayers), the Dyon (farmers), the Ono (merchants), and the Dorman (who were confused in this respect with the Ono).
7. The spot is called *tāna tōgo*. cf. Graule, *op. cit.* p. 171.
8. Or 1933.
9. Probably in 1961 or 1963, if this computation is valid. (The information came from a prominent member of the Yougo aged between fifty-five

## THE SIKILS MYSTERY

and sixty.) It is a matter of common knowledge that the next Sigui will not be celebrated for another ten years or so (we were told this in 1950).

9. These figures are described in M. Graule and G. Dieterlen, 'Signes graphiques soudanais' 1. *Homme*, 3 (Paris: Hermann).
11. The Dogon count a week of five days as six days, just as in French a week of seven days is referred to as 'eight days' and a fortnight as 'fifteen days'.
12. For a discussion of this substitute for God the Creator of Graule, *Dieu d'eau*, Paris, Editions du Chêne, 1948.
13. For a description of the mask of *Masques Dogons*, pp. 470 ff.
14. This information came from a prominent member of the Yougo Dogorou. According to all the initiates, the *kanaga* mask represents on the one hand the static gesture of the god, and on the other hand the swastika, through the repetition of the same gestures at an angle of 90° to the first. The second figure represents the god whirling round as he comes down to earth to reorganize the world in chaos.
15. The largest known example is ten metres long. It was brought back by the Dakar-Djibouti Mission and given to the Musée de l'Homme in Paris; cf. M. Graule, *Masques Dogons*, pp. 234 ff.
16. Thus the Yendoumman Damana niche contains three specimens, the Yendoumman Banama contains four, the Yendoumman Da, three, the Barna, four and the Longuel-du-Bas, three. Cf. M. Graule, *Masques Dogons*, pp. 242 ff.
17. *Ibid.*, pp. 245 ff.
18. For another index that enables us to establish the minimum age of some of the villages, cf. Graule, *Le Verger des Ogol* (Soudan français), *Journal de la Société des Africanistes*, xvii, pp. 65-79.
19. The Hogon of Sanga, who was enthroned in 1935, was thus the oldest man in the area at that date (i.e. the oldest of the Dyon). If we agree that he was born in about 1855, his great-grandfather, who, he claims, was very old when he himself was a young goatherd, was probably born between 1770 and 1780.

Each fermenting-receptacle is evidence of the Sigui for which it was woven and is known as such. This means that these objects form a sequence that is considered by the people to be more than purely numerical.

20. The period indicated by a series of this kind would be 3,440 years by the time the next Sigui came round. It would apparently correspond to the sequence of sixty reigns in which each Hogon appears and which itself covers a period of about 1,500 years. The supreme chiefs of the Arou tribe are in fact chosen when still young, unlike the practice current



## APPENDIX I

among the other tribes. The average reign is likely to be twenty-five years.

- 21 *Sigɔ dolo* in Bambara
- 22 For a discussion of this mythical figure, who corresponds to the Bambaras' Moussou Koron, see later in this article
- 23 The *pô*, *Digitaria exilis* is commonly called 'fomis' in West Africa.
- 24 For a discussion of this mythical figure see later in text.
- 25 In the song the vowel becomes slightly nasal.
- 26 The saying that if you look at Digitaria it's as if the world were spinning (*pô tolo yeneñe aduna gônôde gwaro*) was probably coined to convey this impression.
- 27 Cf. M. Griaule, 'Signes graphiques des Dogon', in M. Griaule and G. Dieterlen, 'Signes graphiques soudanais', *L'Homme*, 3 (Paris, Hermann).
- 28 In the system of notation based on the figure 80 this number is called '80 and 20'. The period of fifty years is very close to that of Sirius's companion. Cf. P. Baize, 'Le Compagnon de Sirius', *L'Astronomie* (Sept. 1931), p. 385.
- 29 For a discussion of this principle cf. Griaule, *Dieux d'eau*, pp. 183 ff.
- 30 After this reform the Hogons' sacrifice was replaced by animal sacrifice.
- 31 This belief still obtains among the Dogon, and also among many other peoples, cf. Griaule, *Jeux Dogons, Travaux et Mémoires de l'Institut d'Ethnologie de l'Université de Paris*, vol. xxx.
- 32 For a discussion of the symbolism attached to the number 7 cf. Griaule, *Dieux d'eau*, p. 60.
- 33 The figure 60 is the old base of the system of notation still used in the Sudan for a number of ritual calculations. In several Sudanese languages 60 is known as the 'Mandé calculation' because the system is believed to have spread from Mandé. Nowadays the various districts use 80 as a base for their calculations. Cf. G. Dieterlen, *Essai sur la religion Bambara* (Paris, P.U.F.).
- 34 There is a contradiction here that has not so far been solved. On the one hand the Dogon accept that Digitaria is in orbit for fifty years and this figure governs the way the Sigui is calculated. On the other hand Siguis are held at sixty-year intervals. Nevertheless, it should be noted that the date of the last Sigui, which was celebrated at the very beginning of the twentieth century, was allegedly brought forward. Does this indicate that the date was regularly brought forward for each ceremony? The uninitiated would thus be kept going with the idea that the official period was sixty years and that, for accidental reasons, it happened to be reduced to a half-century.

The foregoing myth is given here as an indication of the changes or

## THE SIRIUS MYSTERY

- combinations in the system of computation that occur in the 'history' of the black peoples.
35. *pô tolo amma tolo la moy magu.*
  36. According to Innékouzou. *pô tolo*, Digitaris star, has a hidden etymological derivation from *poto to*, 'profound beginning'
  37. See below
  38. The *Digitaris* seed is made up of four parts, only one of which, the outer casing, has a name, *kobu*. The other three are known as *pole*.
  39. This expression is always being used by Manda, whose extremely punctilious mind thus avoids even mentioning the name of one of the most basic tabus of the totemic priests.
  40. For further details cf. Griaule, 'Signes graphiques des Dogons' See also Griaule. 'L'image du monde au Soudan', *Journal de la Société des Africanistes*, XIX, 2, pp. 8-9
  41. Cf. below
  42. They are counted clockwise, starting from the highest figure on the right-hand side
  43. Thus cow is an avatar of the Nommo.
  44. It should be remembered that the Dogon, like the other black peoples, use several different symbols or even several different sequences of images to express a single idea or object. Conversely, a symbol often represents several different things.
  45. The shape of this basket is roughly the same as the outline of a mortar
  46. On the system of symbols represented by this basket
  47. It is understood that Digitaris was the same shape as a basket, but was not a basket
  48. The initiates have a different idea of these dimensions
  49. *aduno keze fû gway*
  50. This drawing is executed in Wazouba inside the sanctuaries during the festival of *aga*.
  51. *kize wogonode para gwây wokuwogo dega buy tura byede.*
  52. *pô tolo kize moy wo gaye bi dedemogo mo nge be*
  53. This has the same root as *sagaitura*, 'strong, powerful' (native etymology).
  54. The number 480 is the product of the base number 80 times the number of 'cans' in the base number 60 which was formerly in use. It is used here to symbolize the largest number of all
  55. Versions of, respectively: Innékouzou, Manda and Ougnoniou.
  56. *pô tolo aduno fû dudun gway*
  57. The men have two 'win'-souls of different sexes. Cf. Griaule, *Dieu d'eau*, pp. 183 ff. The same idea is current among the Bambara, cf. Dieterlen, *Essai sur la religion Bambara* chapter 3

## APPENDIX I

- 58 The figures reproduced here are used in Wazouba.
- 59 This figure was taught to Orignonou in August 1950, by the Hogon of Sanga.
- 60 Yourougou, who was born a single being, is fated to pursue the female soul that is his ideal twin to the end of time. In particular he tried to seize it by snatching away from his mother, the Earth, part of the placenta that emerged after he was born, because he thought it was his twin soul.
- 61 *Fulpes pallatus*.
- 62 Cf. Griaule and Dieterlen, 'Le harpe-luth des Dogon', *Journal de la Société des Africanistes*, xx, 2.
- 63 A man could just as well call it *anam jônu*, 'drawing of men'.
- 64 *Fani*, from which *fanni*, a word used throughout Sudanese Africa, is derived, is the same word as *pô*.
- 65 The expression may possibly indicate the Sirius and Digitaria grouping, or Digitaria and another companion. For Faro or Fanro, the Bambara equivalent of the Dogon Nommo, cf. Dieterlen, *Essai sur la religion Bambara*, chapters 1 and 2.
- 66 Cf. *ibid.*, chapter 1. This refers to a future world that will be heralded by flood waters.
- 67 The *koro wata* blanket, which is worn by elderly inmates at the major Bambara institutions (*djya*), belongs to a series of eight ritual blankets with patterns and colours representing mythology, cosmology and the social structure. They are used at night or worn as clothing, depending on the status, duties and aims of the wearer. Apart from their economic value, they are evidence of the wearer's knowledge. Their ritual use is plain, particularly during marriage ceremonies. The Dogon have similar blankets. The one known as *yanamu* represents a sort of very rough map of the world showing the most important stars.  
For a discussion of the way the Bambara and Dogon set great store by weaving and the various cotton strips, cf. Dieterlen, *Essai*, chapter 5, and Griaule, *Dieu à eau*.
- 68 For a discussion of the parallels between Mouso Koron Koundye and Yasigu, cf. Dieterlen, *Essai*, chapter 1. For a discussion of Mouso Koron Koundye, Pemba and Faro, cf. S. de Ganay, 'Aspect de mythologie et de symbolique bambara', *Journal de psychologie normale et pathologique* (April/June 1949); Dieterlen, *Essai*, chapters 1 and 2.

## APPENDIX II

*The Moons of the Planets, the Planets around Stars, and  
Revolutions and Rotations of Bodies in Space Described by  
the Neoplatonic Philosopher Proclus*

In each of the planetary spheres there are invisible stars which revolve together with their spheres. <sup>1</sup> So said Proclus the Platonic successor in AD 438.

The non-specialist reader may never have heard of Proclus, one of the greatest intellects in the history of philosophy, who lived from AD 410 to 485. The English translations of this Greek philosopher's gigantic output are his *Elements of Theology* (which is not relevant to what we are to consider here), his *Commentary on Euclid*,<sup>2</sup> his *Commentary on the First Alcibiades of Plato*,<sup>3</sup> and one partial and one complete translation of his *Commentary on the Parmenides of Plato*.<sup>4</sup>

What the persistent inquirer will likely *not* be told by any compendium of information on the subject is that most of the works of Proclus were translated into English by Thomas Taylor at the turn of the eighteenth and nineteenth centuries in England and are to be found in a handful of libraries

## APPENDIX II

(though even the British Museum has a far from complete collection of Taylor's life's work)

Perhaps it would be as well to quote the view of Proclus held by Thomas Taylor. One should bear in mind that Taylor was the first man to translate all of Plato's works into English - a mammoth task indeed, but not as gargantuan as translating most of Proclus! Here, then, is what Taylor says of Proclus

To the lovers of the wisdom of the Greeks, any remains of the writings of Proclus will always be invaluable, as he was a man who, for the variety of his powers, the beauty of his diction, the magnificence of his conceptions, and his luminous development of the abstruse dogmas of the ancients, is unrivalled among the disciples of Plato

There are many classical scholars who like to imply that the 'Golden Age' of Greece was the only significant era in Greek philosophy. Within this period one can conveniently place Socrates, Plato, Aristotle, Euripides, Sophocles, Aeschylus, Demosthenes, and the historians Herodotus, Thucydides, and Xenophon.

These brilliant names tend to blind one into accepting the false notion that Greece at any other period in its history was merely second rate in the intellects it produced. Many scholars are passionately dedicated to deriding any Greek intellects either before or after this 'Golden Age'. Some caustic comments have been made about this by other scholars, and there is no denying the tendency to ignore or belittle - even to suppress and deny - Greeks who preceded or followed the glorious 'Golden Greeks' who are most familiar to us. It certainly is an embarrassing fact, then, for certain classical scholars to have to face, that the Platonic Academy continued to function in Athens for over nine hundred years.

## THE SIRIUS MYSTERY

Regarding the Academy, George Sarton says in *A History of Science - Ancient Science through the Golden Age of Greece*<sup>5</sup>

At the time when [the Emperor] Justinian closed its doors, [the Academy] might have celebrated its 916th anniversary — the Academy changed considerably in the course of centuries; it is only the Old Academy that may be considered as Plato's Academy, and it lasted a century and a half or less. To this one might reply that every institution is bound to change with the vicissitudes of time and that the longer it lives the more it must be expected to change. Bearing these remarks in mind, we may put it this way: the Academy of Athens, the Academy founded by Plato, lasted more than nine centuries.

Those who find chronology difficult to comprehend without analogies might wish to ponder this, the duration of the Platonic Academy (apparently on the same site) in Athens was equivalent to the duration to date on English soil of Westminster Abbey, or, the 916 years of life of the Academy as a philosophical institution was equal to the amount of time which elapsed from the Norman Conquest of England in 1066 to the year 1982 (And even after the dismemberment, the Academy continued 'in exile' in Persia, etc.) We thus see that Plato's Academy existed longer on one spot than England has existed since William the Conqueror.

The Platonic tradition in the broader sense, with its gnostic and heretical overtones and its myriad manifestations in later ages in such bizarre and fascinating figures as Giordano Bruno, Marsilio Ficino, John Dee, and even Sir Philip Sidney and the Earl of Leicester — not to mention the troubadours of Provence, Dante in Italy, the Albigensians in France, the Knights Templar, and an infinite range of 'fringe' causes over two and a half millennia, is an agonizing and

impossible problem for the orthodox mind, whatever its creed. For Platonism in the general sense is a creed which denies creed, an anti-institutional tradition known to those who adhere to it as the 'Great Tradition'. It terrifies those weaker mentalities which crave a structured belief-system, they always try to destroy it, but succeed only in destroying individuals and individual 'movements' within the larger tradition.

How can any 'intellectual establishment' conceivably admit that this undercurrent of spirituality has flowed outside the orthodox boundaries of the official religion of Christianity since the third century and the time of Origen? And how confess that Proclus, who lived seven hundred years later than Plato (429-347 BC), had a mind as luminous in his own way as Plato's? What happens to the 'hermetically sealed Greek miracle' then? If Platonism is seen to continue as a persecuted underground movement for two thousand years and more, what conclusions must we draw about the supposed openness of orthodox Western culture? If our commonly accepted pattern of civilization is seen to be based on a lie, based on the denial of the non-orthodox, the implications are so immense that nothing short of a total intellectual upheaval could result. No person with a vested interest, whether a chair at a university or a weekly newspaper, a large corporation or a television station (or a diocesan see) would be completely isolated from the results which would follow. The results need not be destructive in the sense of a political or social revolution, but they would be more fundamental, and hence more far-reaching in the end. It is fear of constructive change (which amounts to fear of the unknown) which is here involved. These indeed are problems. And they go some way to explain why the reader hears nothing of a great many subjects which have a direct relevance to the matter. One of the many such subjects is Proclus. Until recently, no one cared to discuss what Proclus really stood for and what he represents

beyond his own specific ideas. Even to raise the subject of a figure such as Proclus is to bring the skeleton from the closet and rattle it with a vengeance.

Proclus does not even rate his own entry in the *Penguin Companion to Literature*, vol. 4, which deals with classical literature. He is mentioned under an entry for Neoplatonism by D. R. Dudley.

He was a strange combination – possible in that age – of philosopher, logician, mathematician, and mystic. Neoplatonism gave to the intellectual of the last phase of paganism a metaphysical religion. The figure of the sage gazing upwards in contemplation is often found on late imperial sarcophagi.

Notice the phrase ‘possible in that age’, implying as it does that no person today would even consider trying to know something about so many subjects in our age of perverse over-specialization. Proclus, we are told, was a ‘strange combination’. Dudley tells us nothing of what Proclus wrote, nothing of his ideas, nothing of the immense bulk of his writings, and in his bibliography refers us only to the harmless and difficult *Elements of Theology*. We are left to conclude that Proclus was an extinct species like the dodo, interesting only because he was ‘a strange combination possible in that age’. There are very few historians dealing with the fifth century AD. We assume from what Dudley says that only they could be interested in a ‘strange combination possible in that age’. Surely Proclus, of whom we are told nothing of importance, is totally unimportant. Would the *Penguin Companion* mislead its readers? Such a thing is unthinkable.

Professor A. C. Lloyd of the University of Liverpool was given the task of discussing Proclus as part of his contribution to the *Cambridge History of Later Greek and Early Mediaeval*



*Philosophy*,<sup>6</sup> a compendium which did not exist before 1967 and which was reprinted with corrections in 1970. The publication of this large volume of 715 pages marked the attainment of a stage in classical scholarship where many scholars were officially agreeing that they were running out of things to do in the more usual areas and had better begin compiling guidelines for a study of the long-neglected subject of the above-mentioned book. Such lonely figures as Richard Walzer, Philip Merlan, and the late I. P. Sheldon-Williams, long engaged in these arcane pursuits out of pure interest, were summoned to help delineate the bounds within which a new generation of students might have some new fields in which to do their Ph.D. theses and where some original work remains to be done by the professors who have now tidied up the Pre-Socratic field rather well and need new ground for some genuine problem-solving. This has now at last begun to happen.

But to return to Professor Lloyd, who has made an interesting attempt to describe Proclus and some aspects of his thought and writings. It is important for us to know more about Proclus the man.<sup>7</sup> Here is part of Lloyd's account:

Proclus was born at Constantinople in 410 or shortly afterwards. But his parents, who were patricians from Lycia in south west Asia Minor, sent him to school in their country and then to Alexandria to study literature and rhetoric. Instead of law, which was his father's profession, philosophy attracted him, so he attended lectures on mathematics and Aristotle. The next stage was Athens.

His studies at the Platonic Academy there are then described, and it was this School of which he was to become the Head. 'It is not known when he took over the School, but he remained at its head till he died in 485. He never married and

his only defects were a jealous nature and a short temper '.

His short temper seems to have extended to impatience with those who were slow to understand what he was saying or who made irritating difficulties over petty details. For instance, he begins his mammoth work *Commentary on the Timaeus of Plato* with this extraordinarily testy sentence: "That the design of the Platonic *Timaeus* embraces the whole of physiology and that it pertains to the theory of the universe, discussing this from the beginning to the end, appears to me to be clearly evident to those who are not entirely illiterate."

It is now that we begin to consider the connection which Proclus has with the larger subject of our book. We will continue with Professor Lloyd's description of Proclus:

Proclus moved in important political circles, but like other leading Platonists he was a champion of pagan worship against imperial policy and found himself more than once in trouble. There is no doubt of his personal faith in religious practices. A vegetarian diet, prayers to the sun, the rites of a Chaldaean initiate, even the observance of Egyptian holy days were scrupulously practised. He is said to have got his practical knowledge of theurgy from a daughter of Plutarch,\* and according to his own claim he could conjure up luminous phantoms of Hecate. Nor is there any doubt that he put theurgy, as liberation of the soul, above philosophy. But while his philosophy is full of abstract processions and reversions, philosophy was nothing for him if not itself a reversion, a return to the One, though achieving only an incomplete union. Its place can be seen in an almost fantastically elaborated metaphysical system but although this system would not have been created had there not been a religion

\* The Platonist, not the author of the *Lives*.

## APPENDIX II

to justify, its validity does not depend and was not thought by Proclus to depend on the religion.

The connection with the mysteries of Hecate as well as Proclus's practising Egyptian and Chaldaean mysteries immediately arouses in the alert reader the suspicion that Proclus might just possibly have known something of the Sirius mystery. Could this be the case? In a moment we will consider some amazing opinions of Proclus on the heavenly bodies which no historian of science I have encountered has ever taken into account (probably because no one ever actually reads through that gigantic tome known as the *Commentary on the Timaeus of Plato* which I mentioned a moment ago). But first let us examine any further evidence than this slim fact which might link Proclus with the general milieu of our Sirius tradition. Professor Lloyd provides further interesting remarks.

Proclus believed that his metaphysics was the true though hidden meaning of Plato and that this like all Greek 'theology' derived from the secret doctrines of Pythagoreans and Orphics. It can be studied in two works, the *Elements of Theology* and the *Theology of Plato*, with help here and there from the commentaries on the *Parmenides*, *Timaeus* and *Alcibiades*.

It must be emphasized that in the form of such commentaries, the Neoplatonists produced much purely original and creative philosophy. It was fashionable until recently to ridicule their commentary format as derivative and inferior: a pathetic attempt to deride what cannot or will not be appreciated. An example may be seen in the description by Professor Robert Browning of Birkbeck College, University of London, in the *Penguin Companion* volume, of the commentaries of Proclus's later successor

Simplicius as 'misconceived and pedestrian textbooks' The word 'misconceived' is loaded, and immediately lets us know that Professor Browning disagrees with them in principle and therefore derides them. However, in my own reading of Simplicius's *Commentary on Epictetus*, for instance, I was amazed to find a luminous intellect behind the commentary whose dissertations on free will are so startlingly contemporary that I immediately thought of comparing them with writings of our modern cybernetic age such as the fascinating books by Norbert Wiener. In Chapter One Simplicius speaks of 'those who pretend that our opinions and desires, and generally speaking, all of our choices and intentions, are necessary and not at our own disposal, but come from exterior causes outside ourselves, not coming from us of our own volition.' He attacks the 'Behaviourists' of his day in clear and forceful terms which are not restricted in relevance to his own times by any means. Some of his reasoning is acute and his insights are profound. In recent years a huge number of Neoplatonic commentaries on Aristotle have been appearing from the British publisher Duckworth – almost forty volumes are planned, under the editorship of Richard Sorabji.

Of the works of Proclus, it is really the *Commentary on the Timaeus of Plato* (which I shall abbreviate from here on as *In Tim.*) which is the source of Proclus's views on the cosmos and of his views of the Platonic succession of an esoteric tradition from the ancient mystery religions. Professor Lloyd, in a footnote to his passage last quoted, does not give this reference on these points, but instead refers to other works by Proclus. In his entire treatment of Proclus, Lloyd gives only slight and cursory reference to the *In Tim.* However, it is to the *In Tim.* which we must now turn. Since page references to the Greek text of Lipsiae would be useless to most readers, I give page references to Taylor's English translation, vols. I and II.

At the end of Book IV of *In Tim.*, Proclus says (II, 307): 'But it is Pythagoric to follow the Orphic genealogies.\* For the science concerning the Gods proceeded from the Orphic tradition through Pythagoras, to the Greeks, as Pythagoras himself says in the *Sacred Discourse*'

The fact that he entertained this view in relation to the mystery religions is shown in his remarks about Pythagoric principles in *In Tim.*, Book V (II 312): 'But these are Orphic traditions. For what Orpheus delivered mystically through arcane narrations, this Pythagoras learned, being initiated by Aglaophemus in the mystic wisdom which Orpheus derived from his mother Calliope.'

He attaches this view to his discussion in *In Tim.* of celestial phenomena. Not long after the above passage he says: 'For Orpheus calls the moon celestial earth.' And in Book III he says 'The Pythagoreans say (that) the moon is ethereal earth'

Taking these views, as he does, and claiming to be a devotee of Hecate specifically (a 'Hymn to Hecate' by Proclus survives in which he calls her 'Guardian of the Gates'—an ancient Egyptian title of Horus—and Mother of the Gods—an ancient title of Isis, see IV, 4, 6, of Grant's *Hellenistic Religions*),<sup>8</sup> Proclus seems to stand in the position as an initiate capable of knowing something of the Sirius mystery. I have found no references, and it would have been considered impious by him to make any direct references to such an esoteric doctrine. But I have found that many theories of his early seem to reflect on it and be based on its premise of an invisible star. These theories are so extraordinary that I feel an account of them should be made. And the primary importance of them to us is that in them Proclus speaks with full authority in insisting that certain invisible heavenly bodies definitely exist. These bodies are the moons of the

\* Drawn from Pythagorean and Orphic esoteric traditions

planets and the planets of other stars. Furthermore, Proclus seems to have an incredibly enlightened view of celestial phenomena in many other ways as well.

In Book III of *In Tim.* Proclus says (I, 425) that the Moon is made of

celestial earth. Or why else does the moon, being illuminated, produce a shadow, and why does not the solar light pervade through the whole of it? we shall find that fire and earth subsist also analogously in the heavens, fire indeed, defining the essence of them, but each of the other elements being consubstantial with it

Shortly afterwards he says.

The elements being conceived in one way as unmingled, but in another as mingled, the first mixture of them produces the heavens, which contain all things according to a fiery characteristic. For all things are in the heaven according to a fiery mode

We know from other citations above that the theory of the moon being 'celestial earth' is a Pythagoric-Orphic one which Proclus has adopted. The fact that he here extends the observation to the remarks of the general nature of the celestial bodies implies that those ideas come from the same source. The heavens are indeed of a 'fiery mode', for we now know scientifically that stars possess all the normal chemical elements in a fiery mode. Proclus's description of celestial bodies could be perfectly in harmony with our present-day scientific knowledge. It is true, as Proclus says, that the stars may be described with 'fire indeed, defining the essence of them, but each of the other elements being consubstantial with it'. For, though they are ablaze, stars are known to contain all elements.

Proclus makes absolutely clear that when he speaks of 'fire' in the heavens he is speaking figuratively. He says (page 280): 'Hence, the fire which is there (in the heavenly bodies) is light, and it is not proper to disturb the discussion of it, by directing our attention to the gross and dark fire of the sub-lunary region [the below-the-moon, or earthly region]' And to make it beyond the slightest possibility of misunderstanding, he adds (page 281) that fire in the heavens is 'fire which is not perfectly fire' but, rather, star-fire is more properly 'fire which is in energy'

These conceptions are quite astounding in the light of modern science. In fact, modern theories of there being in space an interstellar medium which is of such a tenuous nature that it is barely perceivable to us but nevertheless quite extensive (*not* the old-fashioned 'aether'!), find an uncanny forerunner in Proclus's strange statement from Book III of *In Tim.* (I, 425):

It is also necessary that the middle elements should be in the heavenly bodies, but that different elements should abound in different parts of the celestial regions. And in some places indeed, it is necessary that the fiery nature should widely scatter its splendour, on account of solidity, as in the starry bodies; but in others, that it should be concealed from us, as in the spheres that carry the stars.

No matter what interpretation one may put on these remarks by Proclus, the fact remains that he views the stars as congealed bodies in a celestial medium and that between them lies 'fiery matter' which is invisible to us. As for his references to the spheres, these are hardly the glassy globules familiar to us from more conventional ancient astronomy, as we shall see.

In Book IV of the *In Tim.* (II, 293), Proclus ridicules

epicycles\* and says they are valuable as 'an excellent contrivance' by which to analyse and comprehend the true simple motions of the stars,

just as if someone, not being able to measure a spiral motion about a cylinder, but afterwards assuming a right line moved about it, and a point in the right line measuring its motions, should find what the quantity is of the motion about the spiral in a given time. To this therefore, the attention of those is directed, who employ evolvents, epicycles, and eccentrics, through simple motions, from which they discover a various motion.

We thus see that Proclus, despite his late date, is no prisoner of the Ptolemaic theory of the universe. Ptolemy lived three hundred years before him, but Proclus was a hold-out against his epicycles, preferring the views expressed above. In fact, Proclus views the spheres in a way which is extremely surprising, for in Book IV of *In Tim.* (p. 273) he says: 'Thus also the planets are moved with an advancing motion, but not the spheres of the planets'.

This is quite a clear statement that the planets move while their 'spheres' or – dare we say it? – orbits are really the spaces in which this movement takes place. However, we need not be too cautious here. Benjamin Jowett uses the word 'orbit' in his translation of the text of Plato (38–39) on which Proclus is here commenting. There is no reason why we should refrain from doing the same.

We are thus confronted with a clear description by Proclus (less obscure than Plato's own vague account) of the planets moving in orbits which themselves are clearly

\* Complicated circles-around-circles postulated in the standard Ptolemaic astronomy of Antiquity to try and account for the motions of the planets as seen from Earth.



conceived as trajectory spaces. And this concept is so scientifically accurate and advanced, and so contrary to the then fashionable view that the 'spheres' of the planets moved and carried the planets along with them, that we must appreciate the precocity of Proclus in putting the notion forward so clearly and persistently. Plato's text may be interpreted in the same way, but it is not customary to do so, and it is too vague by far. A typical example of the standard interpretation of the passage in Plato's own *Timaeus* is that given by Professor A. C. Crombie in vol. I of *Augustine to Galileo* (though he does on page 33 describe the *Timaeus* quite starkly as a 'Pythagorean allegory', which is presumably a daring way to put it) on page 49:

The different spheres in which the seven 'planets', Moon, Sun, Venus, Mercury, Mars, Jupiter, and Saturn, were set, revolved with different uniform velocities such as would represent the observed movements of those bodies.

This is purely an *interpretation* of a vague text. One could just as well say that Plato maintained that the spheres did not move and the planets in them were what moved, as Proclus specifically states (and as he seems to think Plato believed).

Proclus goes out of his way to say (p. 279):

[Plato] is evidently of opinion, that the planets become through themselves, more remote from, and nearer to the earth, and that their revolutions according to breadth, are made by their own progressions, and not through being carried by other things, such as evolvents or epicycles.

This puts Proclus in a position diametrically opposite Professor Crombie in interpreting the text of Plato. I am afraid that I, for one, must come down on the side of Proclus.

in such a contest. In any case, Professor Crombie showed himself quick to alter a view if presented with fresh evidence on the matter, as he demonstrated on an entirely different subject in correspondence with myself about a French philosopher, Pierre d'Ailly.

Near the very end of Book IV of *In Tim* (pp. 293 ff) Proclus says:

With respect to the stars, however, those that are fixed, revolve about their own centres. But the planets revolve in conjunction with the inerratic sphere, and each is moved together with its sphere to the east, and revolves by itself according to breadth and depth, and about its proper centre.

It is worth while for us to examine these remarks of his closely. First of all, the 'inerratic sphere' of the fixed stars revolves around the Earth and the planets do the same in conjunction with it. That is the simplest of the motions. But on top of that are several more motions: first, the fixed stars rotate on their axes in a spin rotation, second, the planets do the same; third, the planets do more than that: each planet 'by itself' (i.e. in separate motion from all the other stars and planets as well as separate from the 'spheres') 'revolves according to breadth and depth', which obviously refers to 'becoming by itself more remote from and nearer to the earth', as seen from the previous quote. And this depth of planetary motion, which Proclus here specifically calls 'according to breadth and depth' literally adds a new dimension to any theory of planetary motion. For whereas anyone who observes the sky over long periods can see that the planets appear to get dimmer and brighter as if they were 'becoming more remote from and nearer to the earth', the formal description of planets operating in terms of a dimension at right angles to their apparent revolutions comes very close indeed to pointing to a central point of their

revolutions which is something other than the Earth. There was a tradition that Plato came to believe this, which was publicly proposed by Aristarchus of Samos (an astronomer of the first half of the third century BC) and partially advocated by Plato's friend Heraclides of Pontus (fourth century BC). We know that Proclus was aware of it: 'Let Heraclides Ponticus therefore, who was an auditor of Plato, be of this opinion, for he ascribed a circular motion to the Earth' (*In Tim.* II, 288). In short – that the Earth revolves around some other centre such as the sun. 'But let it be admitted that Plato established it immovable' (*ibid.*). Thus does Proclus admit the controversy and come down on the side of caution concerning revolution about the sun.

It is phenomena that Proclus, with an insight which is difficult for us to comprehend, attributed to all celestial bodies a spin rotation about their axes. And since the Earth is a celestial body, it is to be wondered whether Proclus gathered the appropriate conclusion – that the Earth rotates and that is what makes the sky seem to revolve about us.

In considering this point we must realize that in the *Timaeus*, Plato mentions the rotations of the heavenly bodies on their axes (40a-b): 'And (the Creator) gave to each of (the stars) two movements: the first, a movement on the same spot after the same manner – the second, a forward movement'.

This is an obscure way of saying the stars rotate and the sky circles. (If Plato inserted someone else's treatise into his dialogue without being fully *au fait* with the material – as has been maintained – it may explain the vagueness, though Plato does no better in the *Laws* and was a feeble astronomer; he never showed any aptitude for practical science.) In the same passage as above, Plato also clearly describes the following: 'The earth, which is our nurse, circling around the pole which is extended through the universe', which refers to the rotation of the earth itself on its axis.

Proclus apparently adds of his own volition the other motions for Plato seems only to mention two. Furthermore, Plato's text is too brief and foggy to make it clear exactly what he did mean. The one thing of which we can be certain is that Proclus expended untold tens of thousands of words expounding Plato's meanings in all fields beyond the extent to which Plato himself managed or desired to do. On some subjects this is not particularly gripping. But with this particular subject, every scrap of evidence is essential to unraveling the intended significance of Plato's statements.

In an essay of his entitled 'Platonic Questions',<sup>9</sup> Plutarch provides us with essential evidence that Plato definitely abandoned his earlier geocentric ideas, despite Proclus's nervous demurrals. Plutarch says in Question VIII

What means Timaeus [see Plato's *Timaeus*, 42D] when he says that souls are dispersed into the earth, the moon, and into other instruments of time? Does the earth move like the sun, moon, and five planets, which for their motions he calls organs or instruments of time? Or is the earth fixed to the axis of the universe, yet not so built as to remain immovable, but to turn and wheel about, as Aristarchus and Seleucus have shown since, Aristarchus only supposing it, Seleucus positively asserting it? Theophrastus writes how that Plato, when he grew old, repented him that he had placed the earth in the middle of the universe, which was not its place.

(Plutarch then follows with his own opinion, which is that the earth does not move.)

Theophrastus's testimony here is unimpeachable, but was probably unknown to Proclus, by whose lifetime most of Theophrastus's works would have been lost. Theophrastus was Aristotle's successor and head of the Lyceum at Athens, and an unquestionably reliable source, and Plutarch leaves us

in no doubt (see 'Against Co.otes the Epicurean', 14, in *Moralia*) that he read Theophrastus's actual works attentively, making a misquotation or secondhand report impossible in this instance.

The Seleucus who is mentioned here was a mathematician and astronomer described by George Sarton<sup>10</sup> as follows 'This Babylonian was a follower of Aristarchus of Samos' Seleucus is described differently by Giorgio de Santillana, who gives him another nationality in *The Origins of Scientific Thought*, page 250 'We know of only one [astronomer] who adopted the system [of Aristarchus] a century later, Seleucus of Seleucia, an Oriental Greek from the Persian Gulf'

However, Plato's views on the earth's position in space are less interesting to us in themselves than as they relate to Proclus's interpretation of them, and also as they relate to modern historians of science, who tend to gloss over the possibility that Plato may have adopted a heliocentric theory of a rotating earth moving round the sun, which was obscurely expressed in the *Timaeus* and less tentatively adhered to by Plato 'when he grew old', bearing in mind that the *Timaeus* itself is no early work of Plato's.

In Plutarch's same essay, 29, we find evidence of a continuity from Plato through his student Xenocrates of the belief that the heavens contain more than one element. However, Proclus seems to transcend by far the limited theory of Plato and Xenocrates as here presented. The summary of theories of Xenocrates presumably is drawn from his lost work in six books *On Astronomy* unless from his one lost book on *Things Pythagorean*. Xenocrates was head of the Academy for twenty five years until his death at the age of eighty-two 'from the effects of a fall over some utensil in the night' as Diogenes Laertius tells us.<sup>11</sup>

There is clear proof that Proclus did not himself originate the third motion at right angles to revolution which we have

seen that Plato does not mention. We actually find it referred to by Plutarch in his dialogue 'Of the Face Appearing in the Orb of the Moon', 24.<sup>12</sup> There he says.

Nor is the moon indeed moved by one motion only, but is, as they were wont to call her, Trivia, or Three-Wayed performing her course together according to length, breadth, and depth in the Zodiac; the first of which motions mathematicians call a direct revolution, the second volutation, or an oblique winding and wheeling in and out, and the third (I know not why) an inequancy, although they see that she has no motion uniform, settled, and certain, in all her circuits and reversions.

Plutarch's expressions 'mathematicians call' and 'as they were wont to call her' make clear that he is referring to some unidentified and now lost astronomical works. Plutarch's exposition is not as clear as we could wish, and in a succeeding passage is countered by another speaker who espouses the more fashionable theory of spheres which actually themselves move while, as for the moon: 'some supposing that she herself stirs not'. It is peripherally interesting that in this retort the speaker also cites Aristarchus of Samos as being involved in a controversy over a line from Homer's *Iliad* which Plutarch gives and which is missing from our present text of Homer, a line advocated by Crates\* and opposed by Aristarchus, which correctly describes the sea as covering 'the most part of the earth'.

We must not stray too far from Proclus. In pursuit of him, however, I wish to mention his influence on Johannes Kepler, the sixteenth-century discoverer of the three laws of planetary motion (which are the only ones we possess even

\* Of Maflos, dating from the second century BC. He was the first head of the Library of Pergamon.

now). And in this I have another complaint to make. For not one major work of Kepler's has ever been translated into English.<sup>13</sup> This fact is enough to send one into despair. Who wants to plough through a lot of medieval Latin to read Kepler – and who can? But what has Kepler to do with Proclus? Well, Kepler was steeped – indeed, drenched – in Proclus. The interested reader may turn to the closing pages of *Harmonies of the World* in the Encyclopaedia Britannica vol. 16, *Ptolemy, Copernicus, and Kepler*,<sup>14</sup> and read for himself. He will find there remarks about Proclus, after which Kepler says: 'But also I have recently fallen upon the hymn of Proclus the Platonic philosopher, of whom there has been much mention in the preceding books, which was composed to the Sun and filled full with venerable mysteries' in the context of speculation about 'what did the ancient Pythagoreans in Aristotle mean, who used to call the centre of the world (which they referred to as the "fire" but understood by that the sun) "the watchtower of Jupiter"?'

Here we see that Kepler, the great forerunner of Newton, was delighted with the 'venerable mysteries' of Proclus. In the light of what we know now and will shortly discover further, later in this appendix, about Proclus's theories, what effect did they have on Kepler's own thinking?

Was Proclus standing behind Kepler just as Aristarchus stood behind Copernicus? When will Kepler and Proclus be fully available in English so that any intelligent person can make up his own mind without first becoming fluent in often highly technical medieval Latin? But most important of all, were the greatest advances at the commencement of modern cosmological speculation made by virtue of their generation from suppressed and unorthodox ancient sources such as Proclus and Aristarchus? Did the 'secret' side of ancient astronomy from the Pythagoreans to Proclus really engender the origins of our modern cosmologies? And the corollary of this is: If so, are the possibilities of our making certain

breakthroughs being stymied by the very suppression of the sources which may have engendered the earliest breakthroughs? By cutting off the root of Kepler, can we really expect the branch to continue to flower? If the facts about Proclus's theories which are being presented in this appendix really have gone unremarked by all the leading historians of science upon whom we all usually rely to tell us at second hand all the facts which we feel we have no time to discover at first hand, then something is clearly wrong with the system. We have got to overhaul the mechanics. Otherwise we shall continue to spiral downwards and think we are rising. I am referring to means and sources of inspiration. I do not question for a moment that vast progress is made in many areas. But I do maintain most strongly that our system for deriving inspiration in theorizing about the cosmos is demented because it is incomplete, therefore unbalanced. We should by now have formulated more laws or principles of planetary motion. But it is fashionable for those who read secondhand crabs of Kepler to deride him. He was a 'nut'. We do not attempt to study his means and methods of thinking or even acknowledge the existence of many of his most important sources. And one of those sources was Proclus.

The writings of Proclus are so voluminous that I have to confess that I have not gleaned from them by any means an exhaustive survey of his views. This Appendix is merely a sampling. But of course we have not yet come to the most surprising views of all, which we must now consider:

(The planets') adumbrations are situations according to which they darken us and other things. For the body which is arranged after another body, becomes situated in the front of that which is posterior to it. And they run under each other

Also there are 'their occultations under the sun, and their



evolutions into light      ' Significantly he here turns to the subject

For it is necessary to recur from the phenomena to the reminiscences of invisible natures. For as from these instruments and shadows, we are enabled to commence the contemplation of the celestial bodies; thus also from the latter, we recall to our recollection invisible circulations.

It is not an easy thing to know what Proclus is referring to. His sudden dropping of this large but obscure hint cannot be meant to be understood by everyone - not even those 'who are not entirely illiterate', as he testily warned us in the very first sentence of his huge tome. This particular work by Proclus is extremely difficult to read, and the Thomas Taylor translation has neither any index nor any form of table of contents by which to locate subjects, names or references in the text. The Lipsiae Greek text has an index, but there is no means of correlating it with the Taylor translation, which has no textual numbering.

Can this reference to 'invisible circulations' refer to the invisible circulations of the companion of Sirius? The answer to this question cannot be a final 'no', and the possibility must be seriously considered when we read these next opinions of Proclus from *In Tim* Book IV (II, 281).

As Aristotle, however, inquires why the sphere of the fixed stars, being one, comprehends many stars, but in each of the planetary spheres, which are many, there is only one star, the solution of this conformably to his own opinion may be obtained from his writings. But we have already said something concerning this, and now agreeably to what has been before asserted, we say, that *each of the planets is a whole world, comprehending in itself*

many divine genera invisible to us Of all these however the visible star has the government in each of the (planetary spheres, there are invisible stars, which revolve together with their spheres, so that in each, there is both the wholeness, and a leader which is allotted an exempt transcendency . each of the spheres is a world; theologists also teaching us these things when they say that there are Gods in each prior to daemons, some of which are under the government of other from all which it is evident that each of the planets is truly said to be the leader of many Gods, who give completion to its peculiar circulation

Taylor, in a footnote, rightly calls this an 'extraordinary passage' of the treatise! Italics above are mine

Elsewhere Proclus says (*In Tim*, II, 260): 'There are, however, other divine animals following the circulations of the planets, the leaders of which are the seven planets.' Taylor adds to this in a footnote 'And these, as we have before observed, are what the moderns call *satellites*'

In another of his publications, Thomas Taylor writes, as introduction to his translation of Plato's *Timaeus* itself.<sup>15</sup>

(For) each of these spheres as we have already explained, it follows that every planet has a number of satellites surrounding it, analogous to the choir of fixed stars, and that every sphere is full of gods, angels, and daemons, subsisting according to the properties of the spheres in which they reside This theory indeed is the grand key to the theology of the ancients, as it shews us at one view why the same god is so often celebrated with the names of other gods, which led Macrobius formerly to think that all the gods were nothing more than the different powers of the sun, and has induced the superficial, *index-groping* moderns to frame hypotheses concerning the ancient theology, so ridiculous that they

## APPENDIX II

deserve to be considered in no other light than the ravings of a madman, or the undisciplined conceptions of a child. But that the reader may be convinced of this, let him attend to the following extraordinary passages from the divine commentaries of Proclus on the *Timaeus*. And in the first place, that every planet is attended with a great number of satellites, is evident from the following citation. 'There are other divine animals attending upon the circulations of the planets, the leaders of which are the seven planets; and these revolve and return in their circulations in conjunction with their leaders, just as the fixed stars are governed by the circulation of the inerratic sphere.' [p. 279] And in the same place he informs us, that the revolution of these satellites is similar to that of the planets which they attend, and thus, he acquaints us a little before, is according to Plato a spiral revolution (and) 'about every planet there is a number (of satellites) . . . all of them subsisting with proper circulations of their own' [p. 275]

The reader should note that Thomas Taylor describes this knowledge as 'the grand key to the theology of the ancients' We know from a fragment of Damascius 'the Neoplatonist\* that 'the Egyptian philosophers, who are resident among us, have explained their occult truth, having obtained it from certain Egyptian discourses. According to them, then, it appears to be thus. The One principle of the Universe is celebrated as Unknown Darkness, and this three times pronounced as such . . .' But wherever the information came from, the fact is that Proclus and his Neoplatonic colleagues believed the ultimate secrets of religion concerned two things: the invisible 'Dark' and invisible circulations of

\* Sixth century AD. He was the last head of Plato's Academy, which was forced to close in 529 AD.

certain heavenly bodies, some of which were non-esoteric enough even to be specified, namely the satellites of our planetary system. Proclus winds up a dissertation on the source of this knowledge from 'sacred rumour' which concerns 'invisible circulations' also on page 247 of *In Tim*, II.

Since Proclus specifically describes here and in the passage from *In Tim* II, 281, the orbits of the heavenly bodies as their 'circulations' (Taylor's choice of English), the 'invisible circulations' which he mentioned must be invisible orbits of heavenly bodies, and he also tells us that there are invisible heavenly bodies. So what invisible orbitings of invisible heavenly bodies are so important that they can, as Proclus just told us, 'enable us to commence the contemplation of celestial bodies' and vice versa? Is that not a most curious thought? How can he possibly mean that there are invisible orbitings so important that they may be set against the visible orbitings for importance, the one complementing the other even to the very base of our abilities to contemplate the heavens?

The key to the paragraph from Proclus II, 281, is the expression in it: 'theologists teaching us these things' For in those words Proclus firmly identifies these ideas with a theological as opposed to philosophical tradition, and hence one connected with one or more of his mystery religions. This is just the evidence we need. For it is these mystery religions which we know contained the essence of the Sirius mystery as their secret doctrine. And also as we have seen earlier, Proclus sought to interpret Plato in terms of an esoteric tradition with which Proclus himself was connected directly, as an initiate.

So we see that Proclus believed that invisible stars existed which accompanied the planets, and that each of the planets was a world. And the visible star, that is the planet 'has the government' over the invisible satellites in each case.

## APPENDIX II

How very like the Sirius tradition this is! And as we know from Chapter Two of this book, the Dogon also knew of the moons of at least one of the planets, so that knowledge of them seems likely to have been part and parcel of the Sirius mystery. Can we then conclude that Proclus may be one further person with knowledge of the Sirius mystery?

Proclus is more specific about his planetary moons elsewhere. In his work the *Platonic Theology*, Chapter XIV of Book VII (Vol. II, pages 140-1 of Taylor's translation), we read

But the planets are called the Governors of the world (cosmocrators), and are allotted a total power. As the planetary sphere too has a number of starry animals, so each of the planets is the leader of a multitude of animals, or of certain other things of this kind. In each of the planetary spheres, therefore, there is a number of satellites analogous to the choir of the fixed stars, subsisting with proper circulations of their own. The revolution also of these satellites is similar to that of the planets which they follow and this according to Plato is a spiral revolution. With respect, likewise, to these satellites, the first in order about every planet are Gods, after these daemons revolve in lucid orbicular bodies, and these are followed by partial souls such as ours.

Taylor comments in a footnote in *In Tim.* Book IV (II, 299) 'For "the natures successive" to the stars, are evidently their satellites, which have more than once been mentioned by Proclus.' On the same page a second footnote adds: 'From what is here said by Proclus, it appears that the fixed stars, as well as the planets, have satellites, and that the stars which sometimes are visible, and at other times disappear, are of this description.'

This brings us extremely close to an outright statement of

the principles of the SIRIUS mystery but without any names. These footnotes are to the passage immediately following the one given a moment ago where we first considered Proclus's cryptic reference to the 'invisible circulations'. It is interesting to note that the passage is in the form of a commentary on a specific passage in Plato's *Timaeus* (40-c), which is not only one of the most maddeningly obscure passages in all of Plato ('Do not expect me to explain these mysteries', bewails a baffled George Sarton, p. 451, *op. cit.*) but a passage which Proclus quotes including missing words not otherwise known from the official text of today!

And it is even more curious that the 'missing' words quoted by Proclus are *kai ta toutois ephexes* of which Taylor says 'These words, however, are not to be found in the text of Plato, but form a remarkable addition to it'. Taylor should know, as he had previously translated all of Plato's dialogues including this.

Since Proclus was head of the Academy, he may be assumed to have had a reliable copy of Plato's text in the Academy library. If he did not have a reliable copy of Plato's text in Plato's own Academy, what *did* he have a reliable text of? Hence these words must be entertained as a possibly correct version and should probably be added to the currently accepted text by classical scholars. The meaning of the words is translated by Taylor as: 'the natures successive'—that is successive to the stars. And Taylor's comment is: 'For *the natures successive* to the stars, are evidently their satellites, which have more than once been mentioned by Proclus'.

The fact that a reference to the satellites of stars was dropped from the orthodox text of Plato should come as no real surprise to us. What scribe could fathom the meaning? In copying the manuscripts over the centuries, there creep in corruptions. A reference to satellites of stars would have been too shocking, considered too bizarre. In transmission the words must have been dropped as an incomprehensible

## APPENDIX II

aberration or an insertion. It was only in the Academy's own library that the original words were preserved, safe and musty, in the wrappings of some really old bookrolls with which no one tampered textually. Only in the Academy would ravages against the text of the Master be forbidden.

I do not believe it is a coincidence that our search through Proclus for material relevant to the Sirius mystery has led us to a lost fragment of text of Plato's dialogue *Timaeus*. The fact that these words have been dropped from that dialogue – out of the entire body of Plato's work, which is otherwise so well documented from the myriad commentaries and citations over the centuries – illustrates the controversial nature of our subject as strikingly as any of the 'accidents' we have already encountered in our book. Our Sirius mystery is not letting us down. Every subject we have approached in connection with it has been suddenly transformed as in a distorting mirror in a fun house. Nothing that seemed solid and settled has been able to remain in its mould. Even Plato's solid text begins to quiver like a live jelly. From out of so many ossified subjects have crept mysterious little creatures, which have done disrespectful dances on their premises, indicating that these subjects do not want to lie down and be declared dead. They are living. Inside them glow syzygies and secrets. We cannot force them to turn to stone.

It seems clear that the abandoned four words of text were probably dropped in order to avoid the enormous consequences which must follow upon their being retained. That Plato himself, though not particularly well acquainted with astronomy in an active professional sense, had apparently some links to a tradition which, by being esoteric, seemed to make no sense at all outside a secret 'mystery' context. This is true whether Plato wrote the passages himself or inserted the Pythagorean treatise which has been proposed (see later).

Plato's dialogue *Timaeus* is without doubt the most

difficult and bizarre of the unquestioned Platonic writings. The *Epinomis* is more bizarre, but seems to have been written by Plato's disciple Philip of Opus. It dealt with the stars as divine beings. Let us examine a few remarks concerning this strange work, taken from George Sarton (op. cit.) 'There is more Oriental lore in the *Timaios* than Greek wisdom' (p. 423 note). The astrologic nonsense that has done so much harm in the Western world and is still poisoning well-minded people today was derived from the *Timaios*, and Plato's astrology was itself an offshoot of the Babylonian one. In justice to Plato it must be added that his own astrology remained serene and spiritual and did not degenerate into petty fortune telling' (p. 421). The influence of the *Timaios* upon later times was enormous and essentially evil' (p. 423). 'Many scholars were deceived into accepting the fantasies of that book as gospel truths. That delusion hindered the progress of science, and the *Timaios* has remained to this day a source of obscurity and superstition' (p. 430).

Those are strong words. The *Timaeus* (the more commonly used spelling in English) obviously arouses violent reactions in some! Here we see Sarton, one of the most distinguished and respected historians of science who ever lived, raving hysterically that the 'evil' *Timaeus* was responsible for 'hindering the progress of science'. Sarton's views of Plato in general are incredibly violent and hostile, though many of his criticisms of Plato are quite valid and reasonable if it were not for the purple prose. It is certainly true that there were many faults to Plato's theories, particularly his political ones which Aristotle rightly found so repulsive, and these rouse Sarton to a fury surpassing his slurs on the poor *Timaeus*. But this is common among expert scholars. They have to restrain themselves most of the time for purposes of professional poise and 'objective treatment'. But the mask can fracture and a raw nerve protrudes.

But as for the perplexity or ire which the *Timaeus* seems



## APPENDIX II

alternatively to arouse in so many of those who attempt to study it, we should realize that the tradition is probably true which says that the major portion of the dialogue, which consists of a lengthy speech by the character named Timaeus on the nature of the universe, is really not written by Plato, but was inserted by him as the words of an apparently imaginary character (or a disguised one). For many ancient sources maintained that this part of the dialogue was in reality a Pythagorean treatise which Plato obtained during one of his visits to Sicily. Rather than see the treatise disappear into obscurity, Plato is said to have entered it as the contribution of a character in a dialogue, using the discussion of the other characters as a means of setting it off to proper advantage. And it is this supposed Pythagorean treatise which contains all the material of interest to us in connection with the Sirius mystery. And as for the Pythagoreans, they represented a sacred community and a mystery tradition with roots in Egypt and Babylon (of both of which countries Pythagoras himself was said to be an initiate into the mysteries).

I owe it to the reader to review the evidence that the passage in the *Timaeus* which is of such concern to us, and on which Proclus's commentary is based as it concerns the heavenly bodies, was not even written by Plato. I therefore quote from Book VIII, 85, of the *Lives of Eminent Philosophers* by Diogenes Laertius of the first half of the third century AD (the Loeb Library translation):

Philolaus of Croton was a Pythagorean, and it was from him that Plato requests Dion to buy the Pythagorean treatises. His doctrine is that all things are brought about by necessity and in harmonious interrelation. He was the first to declare that the earth moves in a circle (round the central fire), though some say it was Hicetas of Syracuse.

He wrote one book, and it was this work which,

according to Hermippus, some writer said that Plato the philosopher, when he went to Sicily to Dionysius's court, bought from Philolaus's relatives for the sum of forty Alexandrine minas of silver [an 'equivalent value', for this was before Alexander], from which also the *Timaeus* was transcribed. Others say that Plato received it as a present for having procured from Dionysius the release of a young disciple of Philolaus who had been cast into prison.

According to Demetrius in his work on *Men of the Same Name*, Philolaus was the first to publish the Pythagorean treatises, to which he gave the title *On Nature*, beginning as follows: 'Nature in the ordered universe was composed of unlimited elements, and so was the whole universe and all that is therein.'

In line with this tradition that the treatise embodied into the Platonic *Timaeus* was of Pythagorean origin – and presumably from thence derived itself from Egypt and Chaldaea (Babylonia) – we may read the following interesting remarks of Proclus from *In Tim.* Book IV (II. 273):

The Egyptians prior to (Hipparchos and Ptolemy), employing observations, and still prior to the Egyptians, the Chaldaeans (Babylonians), being taught by the gods, prior to observations, were of a similar opinion to Plato, concerning the motion of the fixed stars. For the Oracles not once only but frequently speak of the advancing procession of the fixed stars.

Note the pointed expression 'taught by the gods, prior to observations'. This highlights the aspect of the tradition as one imparted to men 'by the gods' and then later carried on in concert with observations by the ancient Egyptians. Without my going into a minute discussion of Pythagoreanism, Orphism, and what Proclus calls 'the

Oracles', I hope the reader will have gathered sufficient idea of the gist of the matter

We see that Proclus, using a slender but nevertheless substantial basis of Plato's apparently ancient Pythagorean book *On Nature*, as it is preserved in his *Timaeus*, insisted that the planets had moons, that stars also had satellites, that there were invisible bodies in space with invisible orbits which were somehow of immense importance to us that 'the gods' instructed the ancient peoples of the Middle East in these astronomical facts which were preserved as 'Pythagorean and Orphic' traditions in the Greek world, that epicycles and other fashionable devices to explain astronomical motions were total nonsense, that the 'spheres' did not revolve but only the planets in them, and hinted at the rotation of the Earth on its axis

Proclus was, furthermore a known initiate of the mystery cults of the Egyptians and Babylonians and had a particular connection with rites involving Hecate, the goddess whom we know to be a form of the star Sirius. We may, therefore, conclude that Proclus is of possible interest to us in our relentless pursuit of the Sirius mystery. For he may have known its secrets and made use of the principles of that secret tradition through the indirect means of his more general writings — by hinting broadly at 'invisible orbits' without specifying all of them, and insisting on their importance without giving any really satisfactory reasons. He seems to have been trying to get the principles across without breaking sacred vows against the revealing of the specifics of the case. As he was extremely religious, we know from his character that he would honour such vows. But as he was passionately devoted to making known the general principles of the universe, he would have done exactly what it seems he did do — tell us the story without giving the names of the characters.

A closer study of Proclus in the future would certainly be rewarding (This has now been done by someone who read

my plea. See 'Postscript, 1997, II' at the end of this Appendix.) There are certainly other relevant passages in his works which remain to be dealt with. But we have seen that we must now re-examine Plato as well, for his *Timaeus* has been shown by Proclus to be a more mysterious work than even the most exasperated scholars had ever suspected.<sup>7</sup> And the net of the Sirius mystery is meanwhile seen to spread ever wider through the ancient traditions and literature of all eras.

Two contemporaries of Proclus, named Macrobius and Martianus Capella, also wrote advanced astronomical theories, and both were also in the Neoplatonic tradition. They advocated the notion that the Earth went around the sun. When three people in one tradition at one time write and discuss such advanced material, then a milieu may be said to exist.<sup>18</sup> But, of course, the historians of science have not yet got around to noticing this inconvenient little thing. Nor have they bothered to let us know much about Johannes Scotus Erriugena (otherwise known as John the Scot or Erigena, which is a misspelling) of the ninth century AD, who promulgated the theories of Macrobius and Martianus Capella at the court of Charles the Bald, and wrote a mammoth philosophical work titled *Periphyseon* of half a million words. The latter is now being published slowly in English by the Irish Government, who have decided that Erriugena (which means 'Irish-born') was one of their great native sons and they had better make the most of him. Alas. If only Proclus too had been born in Ireland. Perhaps this is the only way to get these things into print—or even into English. Can't someone invent some more little countries looking for famous sons, and then allocate the sons? That way we might have something of a cultural revival. The Renaissance was due to the rediscovery of the Platonic tradition by the Florentines. When will we discover it?

(This appendix was referred to by two Oxford scientists in the *Quarterly Journal of the Royal Astronomical Society* in

1993 in an article about impacts with cometary debris in the inner solar system, where Proclus's observations are discussed in a fascinating new context<sup>19</sup>)

*Postscript, 1997 I*

The works of Macrobius have been available in English for a long time: Macrobius, *Commentary on the Dream of Scipio*, translated by William Harris Stahl, Number XLVIII of the Records of Civilization Sources and Studies, Columbia University Press, New York, 1952 (this is the work relevant to our subject, Stahl's Appendix A is about the heliocentric theory and gives many references to this disputed subject); *The Saturnalia*, translated by Percival Vaughan Davies, Columbia University Press, New York, 1969 (a fascinating work, but not relevant to heliocentric astronomical theories). In 1983 I published a discussion of 'The Dream of Scipio' and Macrobius's Commentary as the Introduction to *The Dream of Scipio (Somnium Scipionis)*, Studies in Hermetic Tradition, Volume 5, The Aquarian Press, Welthorough, UK 1983, pp 7-17, I should like to take this opportunity to correct a misprint by pointing out that the publication of Stahl's translation was wrongly given there as 1955, whereas it was really 1952.

The works of Martianus Capella have also now appeared in English, having been published the year after *The Sirius Mystery* first appeared. The first volume of commentary had already appeared before publication of this book: Martianus Capella, *Martianus Capella and the Seven Liberal Arts*, Vol. I, by William Harris Stahl (Commentary), Number LXXXIV of the Records of Civilization Sources and Studies, Columbia University Press, New York, 1971, Vol. II, *The Marriage of Philology and Mercury (Translation)*, translated by William Harris Stahl and Richard Johnson with E. L. Burge, Columbia University Press, 1977.

Three volumes of Eriugena have now been published

Iohannis Scotti Eriugena, *Periphyseon (De Divisione Naturae)*, Book I, edited and translated by I. P. Sheldon-Williams with Ludwig Bieler, The Dublin Institute for Advanced Studies, Dublin, 1968 (Vol. I); Book II (Vol. II), 1972, (Vol. III) subsequently but I do not have it.

A book on Heraclides (contemporary with Aristotle, fourth century BC) has also been published. Gottschalk, H. B. *Heraclides of Pontus*, Oxford University Press, 1980. In this book, Gottschalk refers to the heliocentric theory as 'the Philolaic system' (p. 83), after the Pythagorean philosopher Philolaus (born *circa* 470 BC. in southern Italy) who was the first Pythagorean to publish the theory that the earth was not at the centre of the Universe but revolved round a central 'fire'. As mentioned earlier, it has often been suggested that the famous dialogue the *Timaeus* of Plato was mostly written by Philolaus, and that Plato merely took Philolaus's lengthy cosmological treatise and embodied it in a dialogue of his own, not intending this at the time as an act of actual plagiarism but more as an act of homage and to get the ideas more widely circulated. However well the true facts were understood by the members of Plato's Academy at the time (and our earliest record of their being publicly discussed is by Aristotle's pupil Aristoxenus), misunderstandings certainly arose later, when on the one hand the admirers of Plato did not wish to admit that Plato would have borrowed anything from anyone, and on the other hand ill-wishers used this to blacken Plato's name by accusing him of plagiarism. Heraclides believed that the Universe was infinite, and suggested that the stars were complete worlds each with an 'earth' surrounded by an atmosphere, and Gottschalk believes (p. 82) that Heraclides probably suggested these 'earths' were all inhabited, although those comments are lost, since the works of Heraclides survive only in fragments. Heraclides is recorded, however as having claimed, whether seriously or in jest we do not know — that 'a man fell from the

moon' (p. 82). He also believed that the Earth rotated on its own axis once in a synodical day (four minutes less than a solar day), and that the planets Mercury and Venus revolve round the Sun (p. 82). Gottschalk gives many references.

Interpretations of the ancient statements vary greatly. But nothing could be more specific than the statements of Martianus Capella: '... but Venus and Mercury do not go about the earth. Venus and Mercury, although they have daily risings and settings, do not travel about the earth at all, rather they encircle the sun in wider revolutions. The centre of their orbits is set in the sun.'<sup>20</sup>

It is impossible to say that Martianus Capella means anything other than what he states: that Mercury and Venus have the sun at the centre of their orbits. Macrobius is a bit more vague. He says 'The sphere in which the sun journeys is encircled by the Sphere of Mercury, which is above it, and by the higher sphere of Venus as well.'<sup>21</sup> But it is obvious that he is referring to the same theory, that the planets Mercury and Venus orbit the Sun.'

The dialogue *Epinomis* which has survived in the collection of Plato's dialogues also contains a reference to the planets Mercury and Venus orbiting the Sun, although this is not often noticed by historians of science. The *Epinomis* was, frankly, written by somebody who couldn't write. It is awkward and clumsy and does not succeed well at all in presenting what it wants to say. But it was written by some earnest follower or admirer of Plato with strong Pythagorean leanings, possibly during Plato's lifetime. Benjamin Jowett, the chief Plato translator, excluded it from his translation of the *Collected Works of Plato* because it was so obviously by someone else. But a translation of the *Epinomis* may be found in the Victorian edition of the *Works of Plato* in English published by Bohn's Classical Library (a forerunner of the Loeb Classical Library of today).<sup>22</sup> The German scholar

Boeckh suggested that the *Epinomis* had been written by a member of Plato's Academy named Philip of Opus (or Opuntium).<sup>23</sup> This has generally been accepted. Ostensibly, the *Epinomis* was meant to be a continuation of Plato's last work, the *Laws*. The scholar J. N. Findlay is even prepared to believe that Plato really did write the *Epinomis* just before he died, and that Philip of Opus edited it.<sup>24</sup> Possibly Philip, who was no writer, put it together on the basis of some notes Plato had made, and added his own 'angle'. Findlay points out that the dialogue has one very profound suggestion: it suggests the use of irrational numbers in mathematics.<sup>25</sup> Another interesting feature of the dialogue is its preoccupation with the stars and planets and its insistence that they are divine, living beings, and the dialogue states: 'Now to show that we are justly saying they possess a soul, let us consider first their size. For they are not in reality so small, as they appear to be, but each of them is of immense bulk, as is worthy to be believed, for this is admitted by competent demonstrations. For it is possible to conceive correctly that the whole Sun is larger than the whole earth, and that all the stars, which are borne along [he seems to mean the planets, although later he makes it clear that he believes all the stars are large as well] possess a wonderful size.'<sup>26</sup> But for our purposes the most interesting passage speaks of 'the star which revolves with an equal velocity with the Sun and [Venus] has the name of Mercury'.<sup>27</sup> By which the writer is referring, somewhat clumsily, to the theory of Venus and Mercury being heliocentric. I thought it worthwhile to point this out because it is often missed.



## APPENDIX II

### Notes

- 1 *Elements of Theology*, ed. and trans. by E. R. Dodds, Oxford, 1963.
- 2 *Commentary on the First Book of Euclid's Elements* trans. by Professor Glenn Morrow Princeton University Press, 1970
- 3 *Commentary on the First Alcibiades of Plato*, trans. by W. O'Neill, The Hague, 1965
- 4 *Corpus Platonium Medii Aevi Series*, ed. by R. Kribasky, Vol. III of *Plato Latini Parmenides. Proclus in Parmenidem*). Includes English translation by G. E. M. Anscombe and L. Labowsky Warburg Institute, London 1953 Obtainable as Kraus Reprint, Nendeln Liechtenstein, 1973 (translation of Book Seven only), *Proclus's Commentary on Plato's Parmenides*, translated by Glenn R. Morrow and John M. Dillon, Princeton University Press, 1987.
- 5 See Bibliography Ref. page 400
- 6 *The Cambridge History of Later Greek & Early Medieval Philosophy*, ed. by A. H. Armstrong, Cambridge, 1970
- 7 There is a Life of Proclus written by his student and successor Marinus. It was translated by Thomas Taylor and appears in Volume I of *The Philosophical and Mathematical Commentaries of Proclus on the First Book of Euclid's Elements*, London, 1792. A more recent publication of the English may be found in *The Philosophy of Proclus* by I. J. Rowan, Cosmos, New York, 1949.
- 8 *Hellenistic Religions*, ed. by F. C. Grant, in Library of Liberal Arts series, Bobbs-Merrill, Indianapolis and New York, 1953. English translations of four hymns by Proclus are found on pp. 170-2. In all, seven hymns and a fragment of an eighth by Proclus survive today.)
- 9 In vol. V of *Plutarch's Morals*, ed. by W. W. Goodwin, Boston, 1874. The translation of 'Platon's Questions' is by R. Brown and on pp. 425-49.
- 10 *History of Science*, see note 16, page 159
- 11 See Life of Xenocrates in Diogenes Laertius, *Lives of Eminent Philosophers*, 2 vols. trans. by R. D. Hicks, Loeb Library series, Heinemann, London, Harvard University Press, U.S.A. 1966
- 12 Translation included in the same volume as in note 9 above. Also in Loeb Library
- 13 Three short complete works of Kepler are in English. *Kepler's Dream*, trans. with full text and notes, of *Somnium Sive Astronomia Lunaris* by John Lear and P. F. Kirkwood, University of California Press, Berkeley and Los Angeles, 1965. *Kepler's Conversation with Galileo's Sidereal Messenger* trans. by Edward Rosen, no. 5 of 'Sources of Science' series, Johnson Reprint Corp., London and New York, 1965. Also there is a

## THE SIRIUS MYSTERY

brief treatise by Kepler on the *Six-Cornered Snowflake* trans. by Colin Hardie and L. L. Whyte. Oxford University Press. 1965 Two chapters (IV and V of *Kepler's Epitome of Copernican Astronomy* and one chapter (V) of his *Harmonies of the World* are in English. trans. by C. G. Wallis in vo. 16, *Ptolemy, Copernicus, Kepler* of the 'Great Books of the Western World' series, Encyclopaedia Britannica, Inc. Chicago. London, Toronto, 1952 A second translation of Kepler's *Dream* has appeared *Kepler's Somnium*, trans. and commentary by Edward Rosen. University of Wisconsin Press. 1967

14 See previous note

15 *The Cratylus, Phaedo, Parmenides and Timaeus with notes on the Cratylus*. English trans. of Plato by Thomas Taylor with notes, London, 1793 The quotation is from p. 388, in Taylor's Introduction to the *Timaeus*. The copy of this book which I consulted once belonged to the poet Percy Bysshe Shelley, and may be found in the Shelley collection at the Bodleian Library in Oxford.

16 Preserved and trans. in *Corv. Ancient Fragments*, 2nd ed. p. 320

17 Marinus, in his *Life of Proclus*, tells us that Proclus was twenty-eight years old when he wrote *In Tim.*, which gives the date AD 438 at the beginning of this appendix

18 I did not think it right to take space here to enter into a full discussion of the generally ignored ancient heliocentric theories of Macrobius, Martianus Capella, Julian the Emperor (Apostate), Nicholas of Cusa, and so on. As an example of this tradition (which Proclus mentioned and rejected, mistakenly thinking that Plato had done so), I quote a passage from the Fourth Oration (to Helios) of the Emperor Julian the Apostate, 146 C-D, which may be found in the Loeb Library series, which publishes the works of Julian in three vols. 'For it is evident that the planets, as they dance in a circle about (the Sun), preserve as the measure of their motion a harmony between this god and their own movements. To the Greeks what I say is perhaps uncomprehensible as though one were obliged to say to them only what is known and familiar. This indicates a distinctly esoteric tradition which was imbibed from Julian's friend and teacher the Neoplatonist Iamblichus, a predecessor of Proclus. For just before this passage, Julian had said 'Iamblichus of Chalcis, who through his writings initiated me not only into other philosophic doctrines but these also (he is) by no means inferior to (Plato) in genius.' I also refer the reader to 135 B of the same oration by Julian for further exposition of Julian's heliocentric ideas, all of which we may treat as fragments of lost writings of Iamblichus. All of the surviving fragments of Iamblichus have been published Iamblichus Chalcidensis, *In Platoni, Diálogos Commentariorum*

## APPENDIX II

*Fragments* [The Fragments of Commentaries on Platonic Dialogues by Iamblichus], edited and translated by John M. Dillon. E. J. Brill, Leiden, 1973. I also suggest consulting Thomas Whittaker's *Macrobius*, Cambridge 1923. On page 76 we find him summarizing Macrobius's beliefs. Mercury and Venus (have) orbits 'in which they follow the sun as satellites'.

19. Asher, D. J. and Clube, S. V. M., 'An Extraterrestrial Influence during the Current Glacial-Interglacial' *Quarterly Journal of the Royal Astronomical Society*, vol. 34, No. 4, December 1993 pp. 481-51. *The Sirius Mystery* is cited on page 502.
20. Martianus Capella, *The Marriage of Philology and Mercury*. Book VIII ['Astronomy'] 854-858, translated by William Harris Stahl, Vol. II of *Martianus Capella and the Seven Liberal Arts*, Columbia University Press, New York, 1977, pp. 332-3.
21. Macrobius, *Commentary on the Dream of Scipio*. Book I. Chapter 10-6, translated by William Harris Stahl, Columbia University Press, New York, 1952, p. 163.
22. [Pseudo-Plato], *The Epinomis*, translated by George Burges, in Vol. VI of *The Works of Plato*, George Bell and Sons/Bohn's Classical Library [these two competitors merged]. London 189, pp. 36.
23. *Ibid.*, p. 2.
24. Findlay, J. N. *Plato. The Written and Unwritten Doctrines*, Routledge & Kegan Paul, London, 1974, pp. 23, 67, 343.
25. *Ibid.*, p. 343.
26. *Epinomis*, op. cit., Chapter Six. p. 19.
27. *Ibid.* Chapter Nine. p. 27.

## SUMMARY

### *What Proclus Knew*

1. The Ptolemaic theory of the heavens is totally wrong.
2. The moon is made of 'earth' which is placed in a celestial situation, hence 'celestial earth'.
3. The planets themselves revolve rather than their 'spheres'. They do so 'within their spheres (or orbits)'.
4. The stars all rotate on their own axes.
5. The planets all rotate on their own axes.

## THE SIRIUS MYSTERY

6. The planets become 'more remote from and nearer to the earth' in their revolutions.
7. The heavens contain all the four elements in varying proportions but tend to do so according to a 'fiery mode' The fire' in the stars is different from earthly fire and is more properly 'energy' (Earthly fire is a dark and debased form of true fire, or as Proclus expresses it: 'the dregs and sediment of fire' )
8. The heliocentric theory of Heraclides Ponticus is mentioned by Proclus, but rejected by him on the grounds that Plato rejected it (Although we know from Theophrastus that Plato did accept it when old, Proclus did not know this.)
9. The planets have invisible satellites which revolve around them.
10. Certain fixed stars have invisible satellites too
11. These invisible orbitings are as important as the visible ones to us, and can 'enable us to commence the contemplation of celestial bodies'
12. Each planet or star is 'a world'
13. Proclus was initiated into the Egyptian and Babylonian mysteries and would thus have known about the Sirius mystery
14. (*Added 1997:*) Proclus discussed the sacred fraction  $\frac{25}{243}$ , the decimal expression of which is 1.053 The revised figure for the ratio of the mass of Sirius B to our own Sun is precisely 1.053, according to the reference book *Astrophysical Data*, published in 1992 (See discussion of this correlation accurate to three decimal places in Chapter One to this new edition of *The Sirius Mystery* )

### *Postscript, 1997, II*

When I wrote the preceding Appendix (as Appendix I of the first edition of this book), Proclus was really receiving no attention at all. The climate of opinion has now changed

## APPENDIX II

considerably the field of classical studies has become far less stuffy. This is partially because one generation of scholars has died off and been replaced by a more open-minded one.

A young man named Lucas Sturges read this Appendix in the late 1970s and decided to investigate the mystery of Proclus's astronomical knowledge. This led to Lucas studying Greek and in the end doing a thesis on Proclus. I believe I got to know Lucas about 1979 after he wrote to me, and I encouraged him strongly to get to the bottom of the subject. For many years he struggled to find a publisher for his study of Proclus, and initially I persuaded my friend Colin Haycraft, the head of Duckworth, to agree to publish the book. However, years of frustration still lay ahead for Lucas, and Colin did not publish as he was supposed to. It was only in 1996 that Lucas finally had his book published by Edinburgh University Press. As he says in his Introduction, it is the first book about Proclus published since 1949. Entitled *Proclus: Neo-Platonic Philosophy and Science*, it is a very extensive survey of Proclus's work. The only place where I was mentioned was at the end of footnote 4 on p. 312, where *The Sirius Mystery* is sheepishly cited.

The subject of the invisible satellites inevitably got rather swallowed up in a study of the whole of Proclus's work, but the section in Lucas's book which deals with the matter is on pp. 268-71 (two and a half pages out of 340). Lucas includes fresh translations and further passages, as well as some discussion. He states:

The planets and the fixed stars are not the only objects in space. According to Proclus, the planets have satellites, companions normally invisible to the naked eye because the brilliance of the celestial body to which they are attached overshadows them. This is the essence of one of Proclus's most remarkable conclusions. It seems to mean that he had anticipated, long before Galileo's pioneering

observation of Jupiter's moons, the existence of satellites.

He adds

The satellites are said to be eclipsed by the brilliance of their leading star. The existence of satellites in the heavens, circulating around the planets, stands as one of the mysteries of metaphysical speculation. Proclus gives to the planets a spin-rotation on their own axis, in addition to their orbital revolution.<sup>2</sup>

Proclus was very advanced in his notions about cosmic bodies in general

Proclus rejects physical solid spheres, whose combined revolutions can produce the desired orbits. His celestial objects are dynamic. The spheres are not solid bodies at all, but regions of space. The celestial bodies move by themselves. They move by their own power. The celestial bodies travel entirely unhindered through, but also physically unsupported by, the celestial medium. They do not need any crystalline spheres, or epicycles, to carry them around. In this respect, Proclus' theory of celestial motion anticipates the birth of modern celestial dynamics.<sup>3</sup>

Although Lucas gives only passing attention to the matter of the invisible satellites which had originally inspired his quest, his researches do clarify one further startling aspect of the issue. It had not been evident from Thomas Taylor's translations that Proclus had made clear that cosmic satellites are eclipsed by the light from the nearby brilliant stars. This is a most amazing statement, more amazing than the suggestion that planets have moons. For it appears to refer

## APPENDIX II

directly and specifically to Sirius B, a satellite (albeit a stellar one) eclipsed by the brilliance of the star Sirius A. And Proclus also explicitly states, like the Dogon, that the satellites of which he speaks are *invisible to the naked eye*.

It may safely be said, therefore, that the plot thickens!

### Notes

1. Sorvanes Lucas, *Proclus. Neo-Platonic Philosophy and Science*, Edinburgh University Press, 1996, p. 268.
2. *Ibid.* pp. 270–1.
3. *Ibid.*, pp. 298, 282.

### APPENDIX III

## The Surviving Fragments of Berossus, in English Translation

*Note:* The following fragments are published here for the first time since 1876 in order to make them readily available to the reader. Regrettably, the original Greek text is not here included, but may be found in Cory, *The Ancient Fragments* (for which, see Bibliography).

These ancient fragments give accounts of the Babylonian tradition that civilization was originally founded by amphibious beings known as Oannes, Musari, or Annedon (in Greek). This tradition is in striking agreement with the Dogon tradition of the amphibious Nommos, or 'Monitors', who came from the system of Sirius to found civilization on earth.

### FRAGMENT OF BEROSSUS

FROM APOLLODORUS

#### *Of the Chaldaean Kings*

This is the history which Berossus has transmitted to us. He tells us that the first king was Alorus of Babylon, a Chaldaean, he reigned ten sarai [a saros equals 3,600 years] and afterwards Aaparus, and Amelon who came from Pantibiblon then



Ammenon the Chaldaean, in whose time appeared the MUSAELIS Oannes the Annedotus from the Erythraean sea (But Alexander Polyhistor anticipating the event, has said that he appeared in the first year, but Apollodorus says that it was after forty sari, Abydenus, however, makes the second Annedotus appear after twenty six sari ) Then succeeded Megalarus from the city of Pantibiblon, and he reigned eighteen sari and after him Daonus the shepherd from Pantibiblon reigned ten sari, in his time (he says) appeared again from the Erythraean sea a fourth Annedotus, having the same form with those above, the shape of a fish blended with that of a man. Then reigned Euedoreschus from Pantibiblon, for the term of eighteen sari, in his days there appeared another personage from the Erythraean sea like the former, having the same complicated form between a fish and a man, whose name was Odacon (All these says Apollodorus, related particularly and circumstantially whatever Oannes had informed them of concerning these Abydenus has made no mention ) Then reigned Amempsinus, a Chaldaean from Laranchae; and he being the eighth in order reigned ten sari. Then reigned Otiartes, a Chaldaean, from Laranchae; and he reigned eight sari. And upon the death of Otiartes, his son Xisuthrus reigned eighteen sari in his time happened the great deluge. So that the sum of all the kings is ten; and the term which they collectively reigned an hundred and twenty sari. *Syncel Chron 39 Euseb. Chron. 5*

## FRAGMENTS OF BEROSSUS

### FROM ABYDENUS

#### *Of the Chaldaean Kings and the Deluge*

So much concerning the wisdom of the Chaldaeans.

It is said that the first king of the country was Alorus, who

gave out a report that he was appointed by God to be the Shepherd of the people he reigned ten sari: now a sari: [sars] is esteemed to be three thousand six hundred years, a neros six hundred, and a sossus sixty

After him Alaparus reigned three sari: to him succeeded Amularus from the city of Pant.biblon, who reigned thirteen sari:, in his time a semidaemon called Annedotus, very like to Oannes, came up a second time from the sea; after him Ammenon reigned twelve sari:, who was of the city of Pantubiblon then Megalarus of the same place eighteen sari: then Daos, the Shepherd, governed for the space of ten sari:, he was of Pantibiblon, in his time four double-shaped personages came out of the sea to land, whose names were Euedocus Eneugamus, Eneuboulus, and Anementus. after these things was Anodaphus in the time of Euedoreschus. There were afterwards other kings, and last of all Sisithrus: so that in the whole, the number amounted to ten kings, and the term of their reigns to an hundred and twenty sari:. (And among other things not irre.lative to the subject, he continues thus concerning the deluge ) After Euedoreschus some others reigned, and then Sisithrus: To him the deity Cronus foretold that on the fifteenth day of the month Desius there would be a deluge and commanded him to deposit all the writings whatever that he had, in the city of the Sun in Sippara. Sisithrus, when he had complied with these commands, instantly sailed to Armenia, and was immediately inspired by God: During the prevalence of the waters Sisithrus sent out birds, that he might judge if the flood had subsided: But the birds passing over an unbounded sea, and not finding any place of rest, returned again to Sisithrus. This he repeated: And when upon the third tria. he succeeded, for they then returned with their feet stained with mud, the gods translated him from among men: With respect to the vessel, which yet remains in Armenia, it is a custom of the inhabitants to form bracelets and amulets of its wood. *Synce. 38. — Euseb. Praep. Evan. lib. 9 — Euseb. Chron. 5. 8*

## APPENDIX III

### *Of the Tower of Babel*

They say that the first inhabitants of the earth, glorying in their own strength and size, and despising the gods, undertook to raise a tower whose top should reach the sky, where Babylon now stands. but when it approached the heaven, the winds assisted the gods, and overturned the work upon its contrivers: and its ruins are said to be at Babylon: and the gods introduced a diversity of tongues among men who till that time had all spoken the same language: and a war arose between Cronus and Titan: but the place in which they built the tower is now called Babylon, on account of the confusion of the tongues; for confusion is by the Hebrews called Babel. *Euseb. Praep. Evan.* lib. 9. *Symeon. Chron.* 44.

*Euseb. Chron.* 13.

## FRAGMENTS OF BEROSSUS

FROM ALEXANDER POLYHISTOR

### *Of the Cosmogony and Causes of the Deluge*

BEROSSUS, in his first book concerning the history of Babylonia, informs us that he lived in the time of Alexander the son of Philip. And he mentions that there were written accounts preserved at Babylon with the greatest care, comprehending a term of fifteen myriads of years [15 times 10,000 equals 150,000 years]. These writings contained a history of the heavens and the sea, of the birth of mankind, also of those who had sovereign rule, and of the actions achieved by them.

And in the first place he describes Babylonia as a country which lay between the Tigris and Euphrates. He mentions that it abounded with wheat, barley, ocrotis [okra], sesamum [sesame], and in the lakes were found the roots called gongae [gongylis is Greek for turnip], which were good to be eaten,

and were in respect to nutriment like barley. There were also palm trees and apples, and most kinds of fruits, fish too and birds, both those which are merely of flight, and those which take to the element of water. The part of Babylonia which is bordered upon Arabia, was barren, and without water, but that which lay on the other side had hills, and was fruitful. At Babylon there was (in these times) a great resort of people of various nations, who inhabited Chaldea, and lived without rule and order like the beast of the field.

In the first year there made its appearance, from a part of the Erythraean sea which bordered upon Babylonia, an animal, endowed with reason, who was called Oannes. (According to the account of Apollodorus) the whole body of the animal was like that of a fish, and had under a fish's head another head, and also feet below, similar to those of a man, subjoined to the fish's tail. His voice too, and language, was articulate and human, and a representation of him is preserved even to this day.

This Being in the day time used to converse with men, but took no food at that season, and he gave them an insight into letters and sciences, and every kind of art. He taught them to construct houses, to found temples, to compile laws, and explained to them the principles of geometrical knowledge. He made them distinguish the seeds of the earth, and shewed them how to collect fruits, in short, he instructed them in every thing which could tend to soften manners and humanize mankind. From that time, so universal were his instructions, nothing has been added material by way of improvement. When the sun set, it was the custom of this Being to plunge again into the sea, and abide all night in the deep, for he was amphibious.

After this there appeared other animals like Oannes, of which Berossus promises to give an account when he comes to the history of the kings.

Moreover Oannes wrote concerning the generation of

mankind; of their different ways of life, and of their civil polity, and the following is the purport of what he said

'There was a time in which there was nothing but darkness and an abyss of waters, wherein resided most hideous beings, which were produced of a two-fold principle. Men appeared with two wings, some with four and with two faces. They had one body but two heads, the one of a man the other of a woman. They were likewise in their several organs both male and female. Other human figures were to be seen with the legs and horns of goats. Some had horses' feet; others had the limbs of a horse behind, but before were fashioned like men, resembling hippocentaurs. Bulls likewise bred there with the heads of men, and dogs with fourfold bodies, and the tails of fishes. Also horses with the heads of dogs, men too and other animals, with the heads and bodies of horses and the tails of fishes. In short, there were creatures with the limbs of every species of animals. Add to these fishes, reptiles, serpents, with other wonderful animals, which assumed each other's shape and countenance. Of all these were preserved delineations in the temple of Belus at Babylon

'The person, who was supposed to have presided over them, was a woman named Omoroca, which in the Chaldaic language is Thalath; which the Greeks express Thalassa, the sea but according to the most true computation, it is equivalent to Selene, the moon. All things being in this situation, Belus came, and cut the woman asunder and out of one half of her he formed the earth, and of the other half the heavens; and at the same time destroyed the animals in the abyss. All this (he says) was an allegorical description of nature. For the whole universe consisting of moisture, and animals being continually generated therein; the deity (Belus) above-mentioned cut off his own head upon which the other gods mixed the blood, as it gushed out, with the earth, and from thence men were formed. On this account it is that they

are rational, and partake of divine knowledge. This Belus, whom men call Dis, divided the darkness, and separated the Heavens from the Earth, and reduced the universe to order. But the animals so lately created, not being able to bear the prevalence of light, died. Belus upon this, seeing a vast space quite uninhabited, though by nature very fruitful, ordered one of the gods to take off his head, and when it was taken off, they were to mix the blood with the soil of the earth, and from thence to form other men and animals, which should be capable of bearing the light. Belus also formed the stars, and the sun, and the moon, together with the five planets. (Such are the contents of the first book of Berossus.)

(In the second book was the history of the ten kings of the Chaldeans, and the periods of each reign, which consisted collectively of an hundred and twenty sari, or four hundred and thirty two thousand years; reaching to the time of the Deluge. For Alexander, following the writings of the Chaldeans, enumerating the kings from the ninth Ardates to Xisuthrus, who is called by them the tenth, proceeds in this manner.)

After the death of Ardates, his son Xisuthrus succeeded, and reigned eighteen sari. In his time happened the great Deluge; the history of which is given in this manner. The Deity, Cronus, appeared to him in a vision, and gave him notice that upon the fifteenth day of the month Daesrus there would be a flood, by which mankind would be destroyed. He therefore enjoined him to commit to writing a history of the beginning, procedure, and final conclusion of all things, down to the present term, and to bury these accounts securely in the city of the Sun at Sippara, and to build a vessel, and to take with him into it his friends and relations, and to convey on board every thing necessary to sustain life, and to take in also all species of animals that either fly or rove upon the earth, and trust himself to the deep. Having asked the Deity, whither he was to sail, he was answered, 'To the Gods' upon

which he offered up a prayer for the good of mankind. And he obeyed the divine admonition and built a vessel five stadia in length, and two in breadth. Into this he put every thing which he had got ready, and last of all conveyed into it his wife, children, and friends. After the flood had been upon the earth, and was in time abated, Xisuthrus sent out some birds from the vessel, which not finding any food, nor any place to rest their feet returned to him again. After an interval of some days, he sent them forth a second time; and they now returned with their feet tinged with mud. He made a trial a third time with these birds; but they returned to him no more; from whence he formed a judgment, that the surface of the earth was now above the waters. Having therefore made an opening in the vessel, and finding upon looking out, that the vessel was driven to the side of a mountain, he immediately quitted it, being attended by his wife, his daughter, and the pilot. Xisuthrus immediately paid his adoration to the earth and having constructed an altar, offered sacrifices to the gods. These things being duly performed, both Xisuthrus and those who came out of the vessel with him disappeared. They, who remained in the vessel, finding that the others did not return, came out with many lamentations, and called continually on the name of Xisuthrus. Him they saw no more; but they could distinguish his voice in the air, and could hear him admonish them to pay due regard to the gods, and likewise inform them that it was upon account of his piety that he was translated to live with the gods, that his wife and daughter, with the pilot, had obtained the same honour. To this he added that he would have them make the best of their way to Babylonia, and search for the writings at Sippara, which were to be made known to all mankind and that the place where they then were was the land of Armenia. The remainder having heard these words, offered sacrifices to the gods, and taking a circuit, journeyed towards Babylonia.

The vessel being thus stranded in Armenia, some part of it yet remains in the Corcyraean\* mountains in Armenia, and the people scrape off the bitumen, with which it had been outwardly coated, and make use of it by way of an alexipharmic and amulet. In this manner they returned to Babylon, and having found the writings at Sippara, they set about building cities, and erecting temples: and Babylon was thus inhabited again. *Synce's Chron.* 28. *Euseb's Chron.* 5 8

## FRAGMENTS OF BEROSSUS

FROM JOSEPHUS, ETC.

*Of Abraham*

After the deluge, in the tenth generation, was a certain man among the Chaldaeans renowned for his justice and great exploits, and for his skill in the celestial sciences. *Euseb. Praep. Evan.* lib. 9

*Of Nabonassar*

From the reign of Nabonassar only are the Chaldaeans (from whom the Greek mathematicians copy) accurately acquainted with the heavenly motions: for Nabonassar collected all the mementos of the kings prior to himself, and destroyed them, that the enumeration of the Chaldaean kings might commence with him. — *Synce's Chron.* 207

*Of the Destruction of the Jewish Temple*

He (Nabopolassar) sent his son Nabuchodonosor with a great army against Egypt, and against Judea, upon his being informed that they had revolted from him; and by that means he subdued them all, and set fire to the temple that was at

\* Or Cordycan mountains — *Corduarum montibus*, Ea. Ar.



Jerusalem, and removed our people entirely out of their own country, and transferred them to Babylon, and it happened that our city was desolate during the interval of seventy years, until the days of Cyrus king of Persia. (He then says, that) this Babylonian king conquered Egypt, and Syria, and Phoenicia and Arabia, and exceeded in his exploits all that had reigned before him in Babylon and Chaldaea. *Joseph contr Appion.* l.b. I c. 19

*Of Nebuchadnezzar*

When Nabopolassar his (Nabuchodonosor's) father, heard that the governor, whom he had set over Egypt and the parts of Coelesyria and Phoenicia, had revolted, he was unable to put up with his delinquencies any longer, but committed certain parts of his army to his son Nabuchodonosor, who was then but young, and sent him against the rebel, and Nabuchodonosor fought with him, and conquered him, and reduced the country again under his dominion. And it happened that his father, Nabopolassar, fell into a distemper at this time and died in the city of Babylon, after he had reigned twenty nine years.

After a short time Nabuchodonosor, receiving the intelligence of his father's death, set the affairs of Egypt and the other countries, in order and committed the captives he had taken from the Jews, and Phoenicians, and Syrians, and of the nations belonging to Egypt, to some of his friends, that they might conduct that part of the forces that had on heavy armour, with the rest of his baggage, to Babylonia, while he went in haste, with a few followers, across the desert to Babylon; where, when he was come, he found that affairs had been well conducted by the Chaldaeans, and that the principal person among them had preserved the kingdom for him. accordingly he now obtained possession of all his father's dominions. And he ordered the captives to be distributed in colonies in the most proper places of

Babylonia: and adorned the temple of Belas, and the other temples, in a sumptuous and pious manner, out of the spoils he had taken in this war. He also rebuilt the old city, and added another to it on the outside, and so far restored Babylon, that none, who should besiege it afterwards, might have it in their power to divert the river, so as to facilitate an entrance into it: and this he did by building three walls about the inner city, and three about the outer. Some of these walls he built of burnt brick and bitumen, and some of brick only. When he had thus admirably fortified the city with walls, and had magnificently adorned the gates, he added also a new palace to those in which his forefathers had dwelt, adjoining them, but exceeding them in height, and in its great splendour. It would perhaps require too long a narration, if any one were to describe it, however, as prodigiously large and magnificent as it was, it was finished in fifteen days. In this palace he erected very high walks, supported by stone pillars; and by planting what was called a pensile paradise, and replenishing it with all sorts of trees, he rendered the prospect an exact resemblance of a mountainous country. This he did to please his queen, because she had been brought up in Media, and was fond of a mountainous situation. *Joseph contr. Appion lib. I. c. 19. Syncel. Chron. 220. - Euseb. Praep. Evan. lib. 9.*

*Of the Chaldaean Kings after Nebuchadnezzar*

Nabuchodonosor, after he had begun to build the above-mentioned wall, fell sick, and departed this life, when he had reigned forty-three years, whereupon his son Evilmerodachus obtained the kingdom. He governed public affairs in an illegal and improper manner, and by means of a plot laid against him by Nerighssoorus, his sister's husband, was slain when he had reigned but two years.

Upon his death Nerighssoorus, who had conspired against

him, succeeded him in the kingdom, and reigned four years

His son Laborosarchodus inherited the kingdom though he was but a child, and kept it nine months; but by reason of the evil practices he exhibited, a plot was laid against him by his friends, and he was tortured and killed

After his death, the conspirators assembled, and by common consent put the crown upon the head of Nabonnedus, a man of Babylon, and one of the leaders of that insurrection. In his reign it was that the walls of the city of Babylon were curiously built with burnt brick and bitumen

But in the seventeenth year of his reign, Cyrus came out of Persia with a great army, and having conquered all the rest of Asia, he came hastily to Babylonia. When Nabonnedus perceived he was advancing to attack him, he assembled his forces and opposed him, but was defeated, and fled with a few of his attendants, and was shut up in the city Borsippus. Whereupon Cyrus took Babylon, and gave orders that the outer walls should be demolished, because the city had proved very troublesome to him, and difficult to take. He then marched to Borsippus, to besiege Nabonnedus, but as Nabonnedus delivered himself into his hands without holding out the place, he was at first kindly treated by Cyrus, who gave him an habitation in Carmania, but sent him out of Babylonia. Accordingly Nabonnedus spent the remainder of his time in that country, and there died. *Joseph. contr. App. lib. 1 c. 20. Euseb. Praep. Evan. lib. 10*

### *Of the Feast of Sacea*

Berosus, in the first book of his Babylonian history says, That in the eleventh month, called Loos, is celebrated in Babylon the feast of Sacea for five days in which it is the custom that the masters should obey their domestics, one of whom is led round the house, clothed in a royal garment, and him they call Zoganes. *Athenaeus, lib. 14*

THE SIRILS MYSTERY  
FRAGMENT OF MEGASTHENES  
FROM ABYDENUS

*Of Nebuchadnezzar*

Abydenus, in his history of the Assyrians, has preserved the following fragment of Megasthenes, who says That Nabucodrosorus, having become more powerful than Hercules, invaded Libya and Iberia, and when he had rendered them tributary, he extended his conquests over the inhabitants of the shores upon the right of the sea. It is moreover related by the Chaldeans, that as he went up into his palace he was possessed by some god, and he cried out and said 'Oh! Babylonians, I, Nabucodrosorus, foretell unto you a calamity which must shortly come to pass, which neither Belus my ancestor, nor his queen Belus, have power to persuade the Fates to turn away. A Persian mule shall come, and by the assistance of your gods shall impose upon you the yoke of slavery: the author of which shall be a Mede, the foolish pride of Assyria. Before he should thus betray my subjects, Oh! that some sea or whirlpool might receive him, and his memory be blotted out for ever; or that he might be cast out to wander through some desert, where there are neither cities nor the trace of men, a solitary exile among rocks and caverns, where beasts and birds alone abide. But for me, before he shall have conceived these mischiefs in his mind, a happier end will be provided.'

When he had thus prophesied, he expired: and was succeeded by his son Evilmaruchus, who was slain by his kinsman Nerighsares: and Nerighsares left Labassoarascus his son: and when he also had suffered death by violence, they made Nabannidochus king, being no relation to the royal family; and in his reign Cyrus took Babylon, and granted him a principality in Carmania.

And concerning the rebuilding of Babylon by

Nabuchodonosor, he writes thus: It is said that from the beginning all things were water, called the sea (*Thalattis*): that Belus caused this state of things to cease, and appointed to each its proper place: and he surrounded Baby on with a wall: but in process of time this wall disappeared: and Nabuchodonosor walled it in again, and it remained so with its brazen gates until the time of the Macedonian conquest. And after other things he says Nabuchodonosor having succeeded to the kingdom, built the walls of Babylon in a triple circuit in fifteen days; and he turned the river Armacale, a branch of the Euphrates, and the Acracanus: and above the city of Sippara he dug a receptacle for the waters, whose perimeter was forty parasangs, and whose depth was twenty cubits, and he placed gates at the entrance thereof, by opening which they irrigated the plains, and these they call *Echetognomones* (sluices): and he constructed dykes against the irruptions of the Erythraean sea, and built the city of Teredon against the incursions of the Arabs, and he adorned the palace with trees, calling them hanging gardens. *Euseb. Praep. Evan. lib. 10. — Euseb. Chron. 49*

### FRAGMENT OF JULIAN THE EMPEROR (REIGNED AD 360-3)

From Cyril's *Contra Julianum* V, 176 (Migne), we have this fragment of Julian's lost work *Against the Christians*:

That God, however, has not cared for the Hebrews only, but rather that in His love for all nations He hath bestowed on the Hebrews nothing worth very serious attention, whereas He has given us far greater and superior gifts, consider from what will follow. The Egyptians, counting up of their own race the names of not a few sages, can also say they have had many who have

## THE SIRIUS MYSTERY

followed in the steps of Hermes. I mean of the Third Hermes who used to come down to them in Egypt. The Chaldaeans also can tell of the disciples of Oannes and of Belus; and the Greeks of tens of thousands who have the Wisdom from Cherrion. For it is from him that they derived their initiation into the mysteries of nature, and their knowledge of divine things; so that indeed in comparison the Hebrews seem only to give themselves airs about their own attainments.

This translation (with some gaps supplied) may be found in G. R. S. Mead's *Thrice Greatest Hermes*, vol. III, page 199 (1964).

### FRAGMENT OF HELLADIUS

PRESERVED BY PHOTIUS

(c. AD 820–c. 893)

PRESERVED IN THE FORM OF A SUMMARY

(CODEX 279)

(Helladius) recounts the story of a man named Oe who came out of the Red Sea having a fish-like body but the head, feet and arms of a man, and who taught astronomy and letters. Some accounts say that he came out of a great egg whence his name, and that he was actually a man, but only seemed a fish because he was clothed in 'the skin of a sea creature'

I am indebted to Kenneth Demarest for bringing attention to this obscure fragment from the Byzantine Patriarch Photius in his essay 'The Winged Power'. I also quote a portion of his own remarks following it

Helladius' account is extremely valuable, the more so because it is confirmed by the extant pictorial representations of this wise being (called 'the Egg-Born') who exited in a strange suit from some kind of vessel likened to an egg that 'fell' into the sea. Hyginus, Mandius and Xanthus all furnish other corroborating details, speaking of gods in honor of whom the fish form is sacred, who plunged from the sky into the waters of the Euphrates. In another variant (found in the commentary in Germanicus' edition of Aratus) the power of a holy fish pushed ashore on the banks of the Euphrates near Babylon, the 'egg' out of which the 'deity' appeared. Before it landed in the waters, the egg-like vessel was of a luminous appearance. Thus the historian Sozomen tells us that the same type of deity descended into the Euphrates as 'a fiery star' from the sky. Just as these visitant capsules in the water were remembered as 'eggs' from which higher men in fish-garb emerged, so the capsules, when they were in the sky were metaphorically described as great fiery birds or griffons or, again, as winged figures or deific men flying in a winged ring or capsule. 'Space visitors' we would call them today.

## APPENDIX IV

# Why Sixty Years?

The Sigui ceremony of the Dogon is celebrated every sixty years. What precedents for such a period of time, given religious importance, are to be found in the ancient world?

The Egyptians had such a period associated with Osiris.<sup>1</sup> We also find the sixty-year period reduplicated by them in a manner familiar from the reduplications of the fifty-year period of Sirius B, and also in the Dogon custom of speaking of 'uniting two Sigui'. 'The *henti* period consisted of two periods, each containing sixty years.' And this period is described in a *Hymn to Osiris*<sup>2</sup> '... most terrible is his name of 'Asar' (Osiris). The duration of his existence is an eternal *henti* period in his name of "Un-Nefer" '.

The *henti* period may, by pun, have had some association with the phallus, *henn*. I only suggest this because of the connection of circumcision with the Sigui ceremonies of the Dogon. It is pure speculation. *Henti* is also a title of Osiris, presumably arising from the fact that the duration of Osiris's existence is said to be 'an eternal *henti* period'.

My own predilection, when considering the period of sixty years, is to think in terms of a synchronization of the orbital periods of the two planets Jupiter and Saturn, for these come together in nearly sixty years. The orbital period of Jupiter is approximately twelve years and that of Saturn



## APPENDIX IV

approximately thirty years. Five times twelve is sixty and two times thirty is also sixty. Sixty years is the great period which brings into synchronization the movements of the two great outer planets which can be seen by the eye. I have no doubt that this sixty-year period has been of considerable importance in ancient times, and the sharp-eyed Egyptians would have been well aware of it.

In speaking of the revolutions of Jupiter and Saturn, the Neoplatonist philosopher Olympiodorus\* has written: 'That of Jupiter is effected in twelve years. And that of Saturn is completed in thirty years. The stars, therefore, are not conjoined with each other in their revolutions except rarely. Thus, for instance, the sphere of Saturn and the sphere of Jupiter are conjoined with each other in their revolutions, in sixty years. For if the sphere of Jupiter comes from the same to the same in twelve years, but that of Saturn in thirty years, it is evident that when Jupiter has made five, Saturn will have made two revolutions: for twice thirty is sixty, and so likewise is twelve times five; so that their revolutions will be conjoined in sixty years. Souls, therefore, are punished for such like periods.'

These observations of Olympiodorus, from his Commentary on Plato's *Gorgias* in the form of scholia, are cited by Thomas Taylor as comment on a passage by Apuleius (best known as author of *The Golden Ass*) in one of his Platonic essays.<sup>†</sup> 'For in order that the measures and revolutions of times might be known, and that the convolutions of the world might be visible, the light of the sun was enacted, and vice versa, the opacity of night was invented, in order that animals might obtain the rest which they naturally desire. Month likewise was produced, when the moon,

\* Alexandrian, born between 495 and 505 A.D. and still teaching in 565 A.D. He was a pagan, not a Christian, by his own admission, despite his late date. He was equally concerned with both Plato and Aristotle.

having completed the revolution of her orb, returns to the same place from whence she departed. And the spaces of the year were terminated when the sun had passed through the four vicissitudes of the seasons, and arrived at the same sign. And the numerations of these circulations, returning into, and proceeding from, themselves, was discovered by the exercise of the reasoning power. Nevertheless, there are certain circuits of the stars, which perpetually observe a legitimate course, but which the sagacity of men can scarcely comprehend. — the supreme of all of them (is that of the fixed stars) — the second is given to Saturn, the third to Jupiter.

This esoteric cycle conjoining the motions of Saturn and Jupiter would have seemed of immense importance to all ancient astronomers who had a good grasp of their subject. A cycle of sixty years is so long that no single person can live long enough to verify its recurrence a second time. The knowledge of such a cycle required a continuing tradition of observation which implies a priesthood with astronomical inclinations. The discovery and verification over more than one generation of an esoteric cycle joining the two great outer planets would appear as exciting to the ancient priests as discovering DNA has been to modern biochemists. To 'crack' the mysteries of the motions of the two outer planets is quite an achievement. No wonder, then, that the Dogon maintain that a priest who 'united two Sigui' is really rather special. Apart from the fact that no one lives 120 years very easily, and thus 'uniting two Sigui' is accepted as having celebrated two Sigui ceremonies in a lifetime, the reduplication of the cycle may be taken to signify that only by checking to see if it happens a second time can the cycle be verified. To unite two of the cycles is to achieve a *jeun*, which we have just seen the Egyptians describe both as 120 years and as 'eternal'. How can 120 years be 'eternity'? This can be so when eternity is seen to consist of a cyclical construction. In other words, eternity is not a straight line

to infinity but is rather an endless series of coins of the same size compressed into a great spring, known as time, and with the impetus of *happening*

By chance, I found in an extremely obscure old book<sup>5</sup> from early in the nineteenth century a reference to a sixty-year period in the ancient world. The book is primarily a meandering of speculations concerning Stonehenge and British stone circles. It points out that Stonehenge has sixty stones in its outer circle. Then we read: '... (this) outer circle is the orient. cycle of Vrihaspati, 60'.<sup>6</sup> The author later adds: 'The great temple of Rourich, in Oxfordshire,<sup>8</sup> is surrounded with 60 upright stones, the cycle of Vrihaspati, an example not far distant from the others.' Later the author adds: 'the number 60 is the base of the famous cycle called the Saros of 3,600 years of the Chaldees or Caldees of Babylon' and he mentions also that it is the decimal part of the 600-year cycle of the Neros period from the ancient Near East. But as for the 'famous Indian cycle of Vrihaspati', he seems upset that Indian brahmans explained it 'by saying that it arose from 5 revolutions of the planet Jupiter ...'.<sup>9</sup>

Passing beyond our quaint old source book, we may investigate this ramoured Indian cycle of Vrihaspati. We soon discover that it does indeed exist in Indian tradition, where it is more properly known as that of Brihaspati. The name Brihaspati (or Vrihaspati) is the name of the planet Jupiter in Sanskrit, and the cycle which takes its name from this planet is a sixty-year cycle.

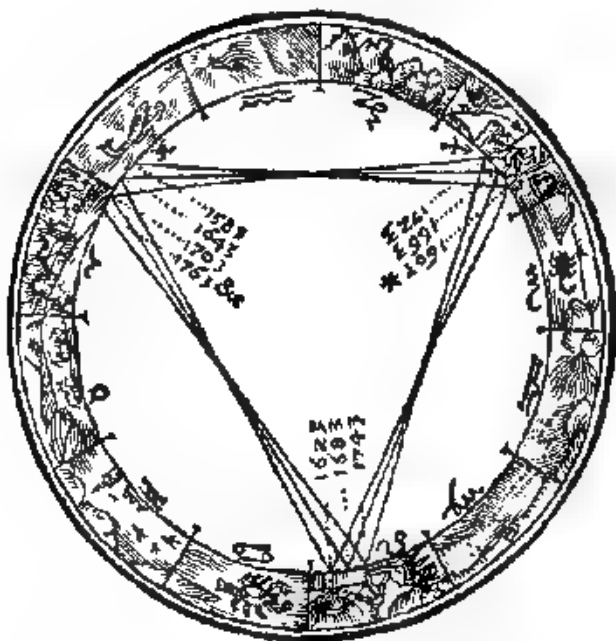
Looking further into the matter of Brihaspati, I discovered that a Brihaspatiacakra has two specific meanings: the Hindu cycle of sixty years, and also 'a particular astrological diagram'. I have not been able to locate a design of this diagram. But the fact that such a diagram exists indicates to me even further that the coincidence of five orbits of Jupiter with two of Saturn may be intended here. For it is by means of a particular astrological diagram that one

traditionally computes the relative positions of Saturn and Jupiter. I reproduce two such diagrams in Figures 61 and 62. These diagrams were prepared by Johannes Kepler, discoverer of our three laws of Planetary Motion, and whom I discussed slightly in Appendix II.<sup>10</sup>

In reference to these very diagrams, Santilana and von Dechend tell us in *Hamlet's Mill*:<sup>11</sup> 'A "mighty conjunction" thus corresponds to the revolution of one angle or corner of the trigon of Jupiter-Saturn conjunctions - built up in sixty years (more correctly, 59.6 years) - through the whole zodiac.' And further: '... (in) Greece where we have besides the wrestling of Kronos and Saturn at Olympia - also the *Daidala*, held in the interval of sixty years - sixty year cycles in India, or in the West Sudan, are not likely to be understood, if the scholars prefer to inhibit the trigon of the Saturn-Jupiter conjunction.' And this trigon must be diagrammatically presented.

We thus see that Santilana and von Dechend specifically identify sixty-year cycles of the West Sudan, where the Dogon live, with the Jupiter-Saturn synchronism over sixty years. This was not known to me when I assumed the same thing: the reader will appreciate that such a concurrence of opinion urged me to think this idea correct.

The Dogon associate a sixty-year period with the creation of the world by Amma.<sup>12</sup> In the light of this, it is interesting that in the Western astrological tradition, Saturn 'gives the measures of creation' to Jupiter specifically through the interconnection of their orbits in the way which we have been describing. Santilana and von Dechend explain this quite well,<sup>13</sup> and Johannes Kepler's works *De Stella Nova* and *De Vero Anno* are relevant to the subject.<sup>14</sup> See also Figures 61 and 62 for the diagrams by which Saturn gives the (temporal) measures of creation to Jupiter. There is a Great Conjunction of Jupiter and Saturn every twenty years, as the diagrams show. The Dogon seem to be aware of the twenty year



*Figure 61* A detailed illustration of the motions of the Trigon of Great Conjunctions from 1583 to 1763

subdivision of the sixty year period too. If the reader turns back to the Griaule and Dieterlen article (Appendix I), and studies Figure 11 accompanying it, and the relevant text, he will see that the Sigui sixty-year computation is broken down into twenty-year segments.

The act of circumcision, to the Dogon, symbolizes the orbit of Sirius B around Sirius A. It may well be, then, that such a tendency to use genital symbolism in connection with heavenly motions explains the 'castration' of Saturn by Jupiter in Greek mythology. Figure 12 of the Griaule and

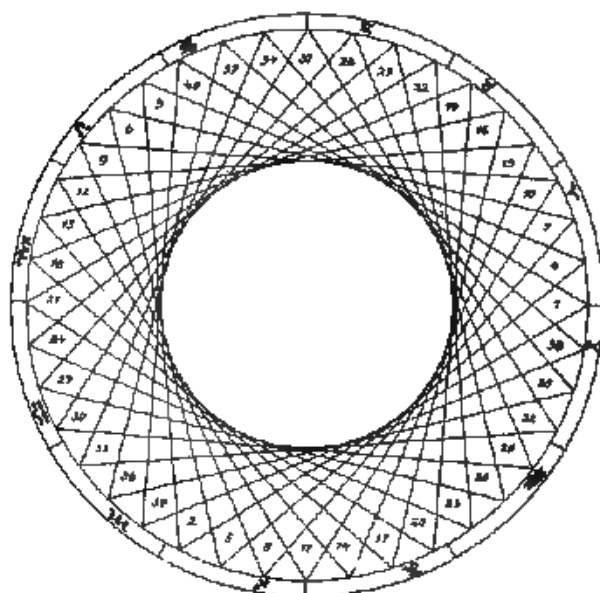


Figure 62 Scheme of the Great Conjunctions of Saturn and Jupiter and their cap through the eighth sign and transit through all four of the triple Zodiac

Dieterlen article in this book records the 'mutilating domination of Sirius over the femininity of Yasioui (see pp 47-8). In *Le Renard pâle* one reads a great deal about genital mutilation, castration, circumcisions, female circumcisions, and so on. These strange conceptions of genital violence associated symbolically to heavenly movements obviously came to the Dogon along with the rest of their ancient traditions, and survive as well in the Mediterranean region indigenously. The mutilation of Saturn by Jupiter, and the various creations which sprang from the resulting blood and

seed, are of the same current of tradition as all the elements of a similar kind to be found among the Dogon, and which are related to these comparative orbitings of Saturn and Jupiter, as well as other heavenly bodies. The placenta comes back into the picture too. We have seen in the main text of the book that the placenta is the symbol, for the Dogon, of a planetary system and the system of our sun and its planets is a placenta. It is therefore interesting that the Dogon say that sixty is the count of the cosmic placenta.<sup>15</sup> For this specifically identifies the sixty years as a count defining our planetary system, and sixty years as the coordination between Saturn and Jupiter's movements can be seen as doing just that. For any system may be seen as defined by its boundaries, and as Saturn and Jupiter are recognized by the Dogon as their outermost planets for our system, their conjunction would strictly speaking define our cosmic placenta, our solar system, for them. The Dogon even break 60 down themselves into '5 series of 12'<sup>16</sup> and twice thirty, which seems a fairly specific indication that our hypothesis has a sound basis. For the last point, the drawing above the door of the Dogon sanctuary of Bino<sup>17</sup> reinforces these ideas. This drawing is used for the computation of the Sigui. Accompanying this drawing is a drawing of the Nommo which is broken down into two major portions: his right 'leg' marks the first thirty years and his left 'leg' the second thirty years. The legs are joined to represent that only taken together do these two thirty-year periods have significance. And, as we know, Nommo did not actually have legs. He had a fish-tail extremity. The fact that each 'leg' represents a period of years is made quite clear by the information given that 'the left leg is made a little longer every year in such a way that it is the same length as the other (leg) by the time of the Sigui.' This process recalls Plutarch's remark, noted much earlier in the book, that Zeus (Jupiter) had his legs joined together.

In short, Jupiter's legs were joined together because each

of his 'legs' represented one of the thirty-year orbital periods of his father Saturn, and it was on his father that he stood. For Saturn upheld Jupiter's creation by providing him with the temporal measures, as Santillana and von Dechend explain.<sup>18</sup> And the Dogon are the people who preserve this intricate tradition most fully, which should not surprise us. They say that sixty is the 'number of the placenta', and indeed it is. Without sixty we could not define our solar system according to the traditional view of it - and this traditional view is the one resting on the capabilities of observation, which is sensible. For us to define our system today by saying it is bounded by the motions of a tiny body called Pluto doesn't mean anything to anybody. For us to ground ourselves in the weighty and ponderous motions of those two observable planets Saturn and Jupiter, and define our solar system - perhaps 'poetically' - by their motions as extremities, we would be striking a deep chord in that music of the spheres of which we have all heard fanciful tales, but of which today we know nothing. But music which cannot be heard is not necessarily lost to the inner ear. Music, after all is not necessarily audible sound. Harmony transcends the sensibly perceptible. The observance of a celestial harmony in the ancient cultures helped keep a sane perspective. To acknowledge the deep resounding bass of the sixty-year cycle was the ultimate poetic myth of the solar system, expressed in that vast mythological fabric woven around all the heavenly bodies, a whole cloth binding together both man and planets in a cosmic unity which gave man dignity and meaning in a world whose periods and cycles he had defined and celebrated in his religious festivals.

Even today we do this, but have lost consciousness of it, Easter is defined by the moon. But who notices that? The cosmic bodies make their silent music but we have stopped our ears. We do not wish to be integrally related to our cosmic environment by observances of the great motions above us.



## APPENDIX IV

All the reader need do is to take the cotton wool out of his ears and listen. He will hear silence. And the cycles and periods of that silence are the beautiful music of the cosmos. But as long as we keep our ears stopped, we will be deafened by our inner noise and will have those tortured 'modern' looks on our faces.

### POSTSCRIPT (1997)

Since the publication of the first edition of this book I have received a great deal of correspondence on the subject of the sixty year period. I have also accumulated more information on the subject myself. The decision to reprint was taken so suddenly that I have time here only to note two articles of which I bought offsprings some years ago when I was working on Chinese astronomy. They are both by Dr Herbert Chatley, who was concerned to explain the prominence of the sixty year period in China.

The sixty-year period in China is called the *jiā zǐ* (using modern Pinyin), although in the old style of the Wade-Giles transliteration system it is spelled *chia tzu*. The Chinese characters are 甲子.

Chatley says of it:

After the well known annual changes of altitude of the Sun and the monthly changes of 'phase' of the Moon, the most *regular* celestial phenomena of a comparable nature are the motions of Jupiter and Saturn and the mutual conjunctions of these two great planets. Jupiter moves round the 'ecliptic' (the path of the Sun) once in twelve years . . . and Saturn once in thirty years . . . They thus come into conjunction, as seen from the Sun, every twenty years . . . and in sixty years (actually 59.5779 is the mean value) they meet again in almost the same place in

the sky (actually  $81^{\circ}$  in advance). The times of conjunction as seen from the Earth are approximately the same and this period of about sixty years is the famous 'Soss' of the Chaldeans and is approximately equal to the Chia-zi (甲子) of the Chinese. The ancients attached very great chronological importance to these conjunctions. In 3,535 years the motions of Jupiter and Saturn are repeated with remarkable accuracy, as after 3,534.96 tropical years they are conjoined within a fraction of a degree and have made integral numbers (298 and 120 respectively) of revolutions about the Sun. This period is possibly the 'Saros' of 3,600 years of which the Chaldeans wrote. The ancients believed in apocatastasis (complete restoration) periods when all the planets would return to certain points and world crises would recur. These periods would be the least common multiples of the individual periods of return.<sup>19</sup>

In another and longer article, Chatley examines the possible origins of the sixty-year cycle in China. He mentions that in the famous Wu family tomb of the Han Dynasty in Shandong Province the sixty-year cycle was used to specify the tomb date of 147 AD. So clearly the cycle had achieved a very high prominence indeed by that time. Chatley mentions that there was a traditional belief that the cycle was very ancient indeed, but he challenges this 'in spite of the popular Chinese belief that this practice goes back to the days of Huang Ti [the mythical Yellow Emperor, and an era of 2637 BC.] Although Chatley believes the cycle of sixty as applied to days, rather than years, may have existed at that time in China, he is inclined to date the prominence of the sixty-year cycle to some time between 66 BC and 85 AD (Han Dynasty). He admits that the importance of the twelve-year cycle of Jupiter was important in China no later than the seventh century BC. He believes the sixty-year cycle count commenced as from 4

AD, but points out that the famous astronomer I Xing (I Hsing) in 724 AD reckoned backwards to a presumed commencement in 1017 BC. However, Chatley thinks that in 4 AD 'The convenience of a numerator of years caused the true Jupiter year to be dropped — and so a regular cycle of sixty tropical years came into being'<sup>20</sup>

I thought it best to widen the discourse by bringing in China, and should point out that the prominence of the Babylonian sixty-year cycle in China at the time of the Han Dynasty evidently coincided with the prominence of the fish-tailed amphibious culture heroes Fuxi, Nü Gua, and the others illustrated in Figures 50 and 51 and discussed on p 434ff, which also are presumably Babylonian in origin. We might assume, therefore, that there was some cultural diffusion whereby Han Dynasty China experienced influence by 'Chaldaean' traditions no later than the first century BC. On the other hand, much more ancient traditions of these things may simply have come into fashion in China at that time, as part of the Han Dynasty defining itself culturally.

The Babylonian influence may well have been much earlier, as is thought to be the case with the general astronomical concepts of the Chinese, which are known to emanate from Babylonian sources. However, it would be too much of a digression to pursue that matter here. I refer readers to my book *The Genius of China* (also entitled in an earlier edition *China. Land of Discovery and Invention*), originally published in 1936 and based upon the researches of Joseph Needham, with whom I first visited China.

The cycle of sixty years also has associations with the crocodile, of which the Dogon say that the fifth part of the dismembered body of the sacrificed Nommo 'was transformed not into trees but into crocodiles which, since the time of the arrival of the Ark [Nommo's ship which descended to Earth], entered the ponds in pursuit of the Supervisors [the eight 'Monitor Nommos who came to

supervise humanity].<sup>21</sup> This seems to be an oblique reference to the fact that the Nommos found the crocodiles troublesome, and that as they swam in rivers, the crocodiles were 'in pursuit of them'. In Chapter One I have noted that the amphibious visitors seem to have constructed a huge artificial lake in Egypt, called by Herodotus Lake Moeris, and one reason for this may have been that the Nile was so infested with crocodiles (and hippopotami) that a 'secure base' was needed where the aliens would not continually be molested. The irony is, therefore, that after the departure of the aliens, it was at this very Lake Moeris (see below) where the crocodile was later elevated to sacred status. Despite being a nuisance to the amphibians, in the eyes of humans this other great watery creature achieved an association with them, especially after the aliens' departure, when only the crocodiles remained for people to see.

In his fascinating essay 'On Isis and Osiris', the first century AD writer Plutarch, who was a priest of Delphi in Greece, records sacred Egyptian traditions of the crocodile as follows. 'The crocodile, certainly, has acquired honour which is not devoid of a plausible reason, but he is declared to be a living representation of God, since he is the only creature without a tongue, for the Divine Word has no need of a voice

They say that the crocodile is the only animal living in the water which has a thin and transparent membrane extending down from his forehead to cover up his eyes, so that he can see without being seen, and this prerogative belongs also unto the First God. They lay sixty eggs and hatch them in the same number of days, and those crocodiles that live longest live that number of years: the number sixty is the first of measures for such persons as concern themselves with the heavenly bodies.'<sup>22</sup> When Plutarch speaks of sacred mysteries he tends to be a bit obscure for reasons of piety, and this passage is no exception. However, it is clear that the cycle of sixty years was regarded by the Egyptians of Plutarch's time

as 'the first of measures' relating to astronomy. And the crocodile was a symbol of it.

Herodotus (fifth century BC) is the one who records that the crocodile was especially sacred in Egypt in the vicinity of the Lake Moeris which (see my Chapter One) he insists was an artificial lake, and which I have pointed out seems to have been a watery base made for the visiting amphibious beings during their stay in Egypt. Herodotus says, 'The dwellers about Thebes and the lake Moeris deem them [crocodiles] to be very sacred. There, in every place one crocodile is kept, trained to be tame, they put ornaments of glass and gold on its ears and bracelets on its forefeet, provide for it special food and offerings, and give the creatures the best of treatment while they live, after death the crocodiles are embalmed and buried in sacred coffins. . . It is the only animal that has no tongue. Nor does it move the lower jaw. It is the only creature that brings the upper jaw down upon the lower.'<sup>21</sup>

The irony of the crocodile as a religious Nommo-substitute is considerable, especially as it would seem that there was nothing a crocodile wanted more than a good juicy bite of a Nommo for its next meal. It is all the more remarkable that the Dogon have kept the real tradition intact and have recorded that the crocodiles in the ponds were *in pursuit of the Nommos*—a fact already wholly disregarded in Egypt 2,500 years ago! But by that date, as Herodotus has also recorded, the ancestors of the Dogon, the Garamantes, were far away in Libya, and were to take the real tradition with them through the sands of the Sahara to West Africa, where it would await our discovery. As for the association of the crocodile with the astronomical cycle of sixty years, it was a symbolic numerical correlation, as Plutarch has explained, but it also probably echoes an earlier association of that cycle with the amphibious aliens, a tradition also preserved by the Dogon despite all the ravages of time.

## THE SIRIUS MYSTERY

### Notes

- 1 Wallis Budge, *Osiris and the Egyptian Resurrection*, op. cit., Vol. II p. 67
- 2 Ibid.
- 3 From his Scholia Commentary to Plato's *Gorgias*, translated by Thomas Taylor, and given by Taylor in a footnote to Apuleius's essay on the Doctrines of Plato, 'On Natural Philosophy', p. 333 in the book cited in next note
- 4 Apuleius. *The Metamorphosis or Golden Ass and Philosophical Works*, trans. by Thomas Taylor. London, 1822. This book contains four of Apuleius's essays of which three are otherwise unobtainable in English translation, one is on 'The God of Socrates' and three are on the philosophy of Plato; the first of these three is relevant here; pp. 313-4 (The one on Socrates was also translated for Bohn's library)
- 5 Higgins. Godfrey, *The Celtic Druids*, London. 1827
- 6 Ibid. p. 240
- 7 Ibid. p. 24.
- 8 The monument which Higgins calls Raurich is now known as Rollright
- 9 Higgins. op. cit., p. 244
- 10 These figures come from Santillana and von Dechend. *Hamlet's Mill* op. cit., and are found there opposite page 134 and opposite page 268.
- 11 Ibid., Appendix 23
- 12 Graule and Dieterlen, *Le Renard pâle*, op. cit., pp. 83-4
- 13 See Note 11
- 14 Ibid. These works of Kepler's are discussed by Santillana and von Dechend.
15. *Le Renard pâle*, p. 177
- 16 Ibid. p. 185
- 17 See Appendix I 'A Sudanese Sirius System'
- 18 See Note 11
- 19 Chatley Herbert. 'The Sixty-Year and Other Cycles', *China Journal*, Vol. XX, No. 3, March 1934. Unpaginated offprint of two pages length.
20. Chatley Herbert, 'The True Era of the Chinese Sixty-Year Cycle', *T'oung Pao* Leiden, Vol. XXXIV, Parts 1-2, pp. 138-45
- 21 Graule, Marcel. and Dieterlen Germaine, 'Le Harpe-Luth des Dogon' *Journal de la Société des Africainistes*, Tome 20, Fascicule 2, 1950, p. 212
- 22 Plutarch, *Peri Isido kai Osirido* ('On Isis and Osiris'), translated by Frank Cole Babbitt in Plutarch's *Moralia* Loeb Classical Library, Harvard University Press. U.S.A. Vol. v. 1962, pp. 173-5
- 23 Herodotus. Book II. 68-9. translated by A. D. Godley. Loeb Classical Library, Harvard University Press. U.S.A., Vol. I. 1960, p. 357

## APPENDIX V

# The Meaning of the E at Delphi

Plutarch wrote a fascinating essay entitled 'The E at Delphi',<sup>1</sup> actually in the form of a dialogue, featuring Plutarch himself and several other speakers. It is to be remembered that Plutarch was a high priest of Delphi, and he knew much and always sought to learn more about the nature and history of the oracles not only of Delphi but elsewhere as well. He was most interested of all in Delphi itself, for he was one of the two priests of Apollo there.

The central subject of the discussion is the letter E which was a prominent inscription at the Delphic shrine. (That is, the letter E was carved in stone quite on its own at Delphi and was a subject of much curious speculation to the classical Greeks, who retained no tradition of the meaning of the ancient inscription of this single letter—see Plate 21, F. C. Babbitt, in his Introduction to the dialogue, says.<sup>2</sup>)

Plutarch, in this essay on the E at Delphi, tells us that beside the well-known inscriptions at Delphi there was also a representation of the letter E, the fifth letter of the Greek alphabet. The Greek name for this letter was EI, and this diphthong, in addition to being used in Plutarch's time as the name of E (which denotes the number five), is the Greek word for 'if', and also the word

for the second person singular of the verb 'to be' (thou art)

In searching for an explanation of the unexplainable it is only natural that the three meanings of EI ('five', 'if', 'thou art') should be examined to see if any hypothesis based on any one of them might possibly yield a rational explanation.

Plutarch puts forward seven possible explanations of the letter.

Attempts to explain the letter have been also made in modern times by Götting and by Schultz. Roscher, C. Robert, O.

Lagercrantz, W. N. Bates, in the *American Journal of Archaeology*, xxix (1925), pp. 239-46, tries to show that the E had its origin in a Minoan character E, later transferred to Delphi. Since the character was not understood, it, like other things at Delphi, came to be associated with Apollo. This character has been found on the old omphalos discovered in 1913 at Delphi in the temple of Apollo.

Interesting are the two coins reproduced in Imhoff-Blumer and P. Gardner, *A Numismatic Commentary on Pausanias*, plate X nos. xxii and xxiii (text p. 119), which show the E suspended between the middle columns of the temple. Learned scholars should note that the letter represented is E, not EI; therefore such explanations as are based on the true diphthong are presumably wrong.

The second explanation offered by Plutarch seems to me the correct one. This is how Plutarch suggests it:

Ammonius smiled quietly, suspecting privately that Lamprias had been indulging in a mere opinion of his own and was fabricating history and tradition regarding a matter in which he could not be held to account. Someone else among those present said that all this was similar to the nonsense which the Chaldaean visitor had



## APPENDIX V

uttered a short time before; that there are seven vowels in the alphabet and seven stars that have an independent and unconstrained motion, that E is the second in order of the vowels from the beginning, and the sun the second planet after the moon, and that practically all the Greeks identify Apollo with the Sun.

The facts that Delphi is the second descending centre in the geodetic octave, and that it is symbolized by the second vowel E, would seem to go well together. The seven vowels (each corresponding to one of the oracle centres) were uttered in succession as the holy 'unspeakable' name of God by Egyptian priests. Demetrius of Phalerum, the student of Aristotle's Lyceum and who founded the famous great library of Alexandria when later in life he was exiled to Egypt, tells us in his surviving treatise *On Style* 'In Egypt the priests sing hymns to the gods by uttering the seven vowels in succession, the sound of which produces as strong a musical impression on their hearers as if flute and lyre were used.'

In Chapter XVI of *The White Goddess*, Robert Graves discusses this too, and there quotes Demetrius. Graves also refers to an eight-letter version of the sacred name. It may be that if one wants to count the base oracle centre (which in musical analogy is the octave expression of the top centre) one should have an eight-letter version. This version of the name is.

JEHUOVAÖ

Note that E is the second letter

We are faced with archaeological evidence that the second vowel, E, was prominent & associated with the second oracle centre in descending order. (See Plate 21.) And we know from Herodotus that Dodona, the top oracle centre, was said to be founded by Egyptian priestesses from Thebes in Egypt. We also know that certain Egyptian priests sang the seven

vowels (or eight vowels, including an aspirate) in succession. We have already seen that the geodetic oracle centres seem to have an octave structure. And as this book went to press (in 1976) a discovery became known which demonstrated the existence of the heptatonic diatonic musical scale in the ancient Near East. We may even make a presumption that the uttering of the seven vowels in succession may possibly have corresponded to the seven notes of the octave (but we may never know that for certain). And it is most important to emphasize that, however bizarre to us, the association of a vowel with an oracle centre is not our invention or surmise. The E may not only be read about in Plutarch but seen on ancient coins and on the omphalos stone itself (for both of which see Plate 21). And this association of the second vowel with Delphi has never been explained by anyone.

So granted all the above, what follows? If each oracle centre had a vowel associated with it, then the second vowel being associated with the second centre would seem to imply a corresponding arrangement for the other centres. And if that is the case, it would seem that the entire system would be associated with and actually comprise a geodetic spelling-out, over eight degrees of latitude, of the unspeakable holy name of God, known commonly to the Hebrews as 'Jehovah'.

It is most important that anyone intrigued by this possibility should keep a wary eye for any further evidence. We should be on the lookout for representations of or associations of other vowels at the other centres. These may already be known to specialists in the field or there may be evidence of this sort languishing unclassified and unexplained in the basement of some museum. Or this sort of evidence may come to light at any time in the future. One place to begin looking would, it seems to me, be with an examination of the omphalos stone from Delos, which is to be seen in Plates 15 and 18. Does this omphalos stone have a single letter inscribed on it similarly to the Delphi omphalos

## APPENDIX V

stone? And what of all the other omphalos stones, such as the one from the Temple of Amon in Egypt (see Plate 19)? Are any of these well enough preserved to show a puzzling single hieroglyph of a vowel? I have not carried out any investigation of this sort myself at the present time.

In closing, it would seem that the E at Delphi must fall into some coherent system of the kind I suggest, and the explanation of the enigma must be connected with Plutarch's lightly advocated second explanation—that to do with E being the second vowel. (Babbitt's exclusion of the diphthong on the basis of the ancient coins to be seen in Plate 21 is therefore crucial and to my view conclusive.)

### Notes

The dialogue "The E at Delphi" is to be found in English in Volume V of Plutarch's *Moralia* (altogether 15 vols.) published in the Loeb Classical Library series, London: William Heinemann Ltd. and U.S.A.: Harvard University Press. The volume first appeared in 1936, and the translation is by Frank Cole Babbitt. Other works of Plutarch in the same volume are "Isis and Osiris," "The Oracles at Delphi No Longer Given in Verse," and "The Obsolescence of Oracles."

2. Ibid. See Plate 21.

## APPENDIX VI

# Why the Hittites were at Hebron in Palestine

We read in Genesis 23.7 that 'Abraham stood up and then bowed low to the Hittites, the people of that country'. The only trouble about this is that, according to our extremely sound archaeological knowledge, there should not have been any Hittites in 'that country'—namely, at Hebron in Palestine. The Hittite conquests never extended that far south. So what do we do with this riddle?

In his book *The Hittites*, Professor Oliver Gurney has an entire section (pp. 59-62) entitled 'The Hittites in Palestine'. In it he says

We have now to deal with the paradoxical fact that, whereas the Hittites appear in the Old Testament as a Palestinian tribe, increasing knowledge of the history of the ancient people of Hatti has led us ever farther from Palestine, until their homeland has been discovered in the heart of the Anatolian plateau. Moreover, the preceding outline of Hittite history will have shown us that before the reign of Suppiluliumas there was no Hittite state south of the Taurus, that the Syrian vassal states of the Hittite Empire were confined to the area north of Kadesh on the Orontes, and that although Hittite armies reached Damascus, they never entered Palestine itself. Of the

neo-Hittite states there was none south of Hamath, and the latter did not include any part of Palestine within its territories, being separated from it by the Aramean kingdom of Damascus.

The presence of Hittites in Palestine before the Israelite conquest thus presents a curious problem. So far from explaining it, all our accumulated knowledge of the people of Hatt [the Hittites] has only made it more perplexing.

References in the Bible include Genesis 23 (entire), Genesis 26 9-11, 34-5, 27 46 (where Rebecca says to Isaac: 'I am weary to death of Hittite women! If Jacob marries a Hittite woman like those who live here, my life will not be worth living!'), and 36:1-3. Further crucial reference to the Hittites appears in the Book of Numbers 13 29. There Moses is told by some men he had sent at the Lord's command to explore Hebron (and we are told in Numbers 13 22-3, that Hebron 'was built seven years before Zoan in Egypt'—which is a curious remark, implying a connection between Hebron and Egypt and also that there was something special at Hebron which could be described as 'built'), that at Hebron they had seen the Hittites.

We thus find clear evidence in books of the Bible for the Hittites residing in Palestine. And their settlements were specifically in the hills at Hebron. Gurney says: 'Who, then, were these Hittites of the Palestine hills? A very ingenious answer has been put forward by E. Forrer.' The gist of this is that, considerably before 1335 B.C., some Hittites from the city of Kurušamma in the north-east of Anatolia had gone to Egypt, of which documentary evidence exists.

However surprising it may seem, the text here quoted states explicitly that during the reign of Suppiluliumas some men from this obscure northern city entered the

'land of Egypt', a term which would include all territory under Egyptian rule. The text leaves the circumstances under which this occurred obscure, but the reference to the Weather-god of Hatti as the instigator of the move is in favour of a deliberate act of state rather than a flight of fugitives from the Hittite conquest, as suggested by Forrer. However that may be, we have here one certain instance of a group of Hittites (i.e. subjects of the King of Hatti) entering Egyptian territory, and the possibility of their having settled in the sparsely populated Palestinian hills is not to be ignored. (But) emigration of Anatolian Hittites to Palestine cannot have been a frequent occurrence. (and) there is some hope that further excavation [of texts] among the archives of Boghazkoy will bring enlightenment.

It should be pointed out that the reign of Suppiluliumas during which the above emigration took place covered the years 1380-1346 B.C. It was to him that the widow of Tutankhamen, the Egyptian Queen Ankhesenamun, third daughter of Pharaoh Akhenaten, sent a plaintive letter asking for one of his sons to become her husband. He sent a son, but the son was ambushed on the way to Egypt and killed, probably by Hor-em-heb, who seized the throne of Egypt and forced Ankhesenamun to marry him in order to legitimize his usurpation. This is a sad story but does not really concern us here. I mention it merely to bring to life the chronology of the emigration to Hebron, and also because it demonstrates the close links possible at that time between the Hittites and Egypt. Those who wish to read the letter in full and follow up this interesting tale of personal tragedy are referred to *Ancient Near Eastern Texts* (ed. Pritchard, see Bibliography), pp. 319, 395.

However the Hittite emigration in the reign of Suppiluliumas cannot have been the original Hittite

settlement at Hebron. For if Abraham met Hittites when he arrived at Hebron, then there must have been Hittites there for several hundred years before the reign of Suppilulhumas which extended 1380-1346 BC. We learn from George Roux in his book *Ancient Iraq*, p 242 'Abraham and his family came from Ur in Sumer to Hebron in Canaan, probably about 1850 BC, and there are good reasons for placing Joseph's migration to Egypt during the Hyksos period (1700-1580 BC)' Despite the fact that there can be a case made for Abraham's Ur being a different Ur, the main point is the date, for Abraham went to Hebron and met Hittites already there five hundred years before the emigration which Garney mentions. Roux repeats his dating, and gives references, on page 215 of his book.

It is likely that, half a millennium after Abraham, the Hittite emigration of which we have proof during the reign of Suppilulhumas went to Egyptian territory, and quite probably to Hebron, to reinforce the Hittite community which had already been there for many centuries, but which was facing hard times. One has only to read the Amarna Letters in translation in *Ancient Near Eastern Texts* - vivid, compulsive, desperate documents - to know the anarchy into which the region of Palestine was plunged during this period. The prince of the Hebron region, Shuwardata, first fought the rapacious Apiru raiders who swarmed over the country side and then joined them, rebelling against the Pharaoh before whom, in his correspondence, he had shortly before been 'bowing seven times and again seven times, both prone and supine'. But Egypt was weak, and Palestine degenerated into chaos. It is no wonder that during this period there was a Hittite migration to what was titular Egyptian territory. No Hittite settlement at Hebron could have felt itself entirely secure. But what was the reason for the Hittite settlement at Hebron in the first place?

In the light of our earlier elucidation of the geodetic

oracle octaves, it seems clear that the presence of the Hittites at Hebron can be explained on religious grounds. For we know that Hebron was the 'base oracle' centre of the eastern geodetic oracle octave. The top centre of this same octave was Metsamor at Ararat, to the north and east of Hittite territory, and is probably the reason why the Hittites who migrated to 'Egyptian territory' during the reign of Suppilulimas were from an obscure north-eastern city (because this was the closest Hittite region to Ararat). The area of Ararat was later to become the kingdom of Urartu, and we know that this kingdom and the Hittites were not altogether strangers, for we learn from Gurney, pp. 44-5 'The North Syrian Hittite states . . . may have felt a certain racial or cultural affinity with Urartu'.

Since we have documentary evidence that it was a divine command which made the Hittites of the fourteenth century BC go to what we assume was possibly Hebron, we can see that they were obeying an oracular injunction. This is natural if their activity was connected with the oracle centres. Indeed, they could not have gone without a divine command on such exclusively divine and non-imperial business. Gurney may be quite right in saying that the journey was a deliberate act and not a flight of fugitives. It was as deliberate as the 'doves who flew to Dodona'.

We have distinct evidence that Hebron really did have an oracle centre, apart from its being on the same latitude as Behdet. To investigate this, we turn to *The White Goddess* by Robert Graves, where in Chapter IX he discusses Hebron a great deal.

But Caleb . . . conveyed the Holy Spirit to Hebron when, in the time of Joshua, he ousted the Anakim from the shrine of Machpelah. Machpelah, an oracular cave cut from the rock, was the sepulchre of Abraham, and Caleb went there to consult his shade . . . it is likely that neither



## APPENDIX VI

Isaac nor Jacob nor their 'wives' were at first associated with the cave. The story of its purchase from Ephron and the Hittites, as told in Genesis 23. Though late and much edited, this chapter seems to record a friendly arrangement between the devotees of the goddess Sarah, the Goddess of the tribe of Isaac, and their allies the devotees of the Goddess Heth (Hathor/ Tethys?) who owned the shrine. Sarah was forced out of Beer-Lahai-Roi by another tribe and came to seek an asylum at nearby Hebron (p. 162).

Graves states (p. 164) that 'Abraham' was in fact a tribe, and that this tribe also came down from Armenia (vicinity of Ararat). He says "Abraham" being in this sense the far-travelled tribe that came down into Palestine from Armenia at the close of the third millennium BC. 'In fact, we must give some thought to 'the chosen people' - later known as Hebrews - being 'chosen' in the sense that they were particularly connected with tending an oracle centre or centres. Did Abraham go to Hebron for the same reasons that the Hittites did?

Graves says (p. 164):

J. N. Schofield in his *Historical Background to the Bible* notes that to this day the people of Hebron have not forgiven David for moving his capital to Jerusalem ('Holy Salem') which they refer to as 'The New Jerusalem' as though Hebron were the authentic one. There is a record in the Talmud of a heretical sect of Jews, called Melchizedekians, who frequented Hebron to worship the body (consult the spirit?) of Adam which was buried in the cave of Machpelah.

In fact, these Melchizedekians, though considered heretics, may have been adherents of a purer undistorted form of

worship. And it may be that David was the great perverter of Judaism by moving Holy Salem away from Hebron. Graves continues

For Adam, 'the red man', seems to have been the original oracular hero of Machpelah; it is likely that Caleb consulted his shade not Abraham's, unless Adam and Abraham are titles of the same hero. Elias Levita, the fifteenth-century Hebrew commentator, records the tradition that the teraphim which Rachel stole from her father Laban were mummified oracular heads and that the head of Adam was among them. If he was right, the Genesis narrative refers to a seizure of the oracular shrine of Hebron by Saul's Benjaminites from the Calebites.

Caleb was an Edomite clan; which suggests the identification of Edom with Adam: they are the same word, meaning 'red'. But if Adam was really Edom, one would expect to find a tradition that the head of Esau, the ancestor of the Edomites, was also buried at Hebron, and this is, in fact, supplied by the Talmud — that Esau's body was carried off for burial on Mount Sear by his sons, and that his head was buried at Hebron by Joseph.

Elsewhere (page 167) Graves says

It is possible that though the Calebites interpreted 'Adam' as the Semitic word Edom ('red') the original hero at Hebron was the Danaan Adamos or Adamastos, 'the Unconquerable', or 'the Inexorable', a Homeric epithet of Hades, borrowed from the Death Goddess his mother.

Graves says that according to the tradition (p. 161): 'Hebron may be called the centre of the earth, from its position near the junction of two seas and the three ancient continents.'

How similar this 'centre of the earth' epithet is to Delphi's, as 'the navel of the world'. All the main oracle centres were navel or *emphatos* centres of the earth. Hebron's description as such is what one would have predicted. The traditions of the creation of Adam at Hebron and of its being the site of the Garden of Eden, as Graves tells us in this chapter, make sense also when it is realized that Hebron was the base of the entire eastern geodetic octave of oracle centres. It was the eastern counterpart of Behdet itself.

Graves tells us at the beginning of Chapter Four of the later history of Hebron.

A confederacy of mercantile tribes, called in Egypt, 'the People of the Sea' . . . invaded Syria and Canaan among them the Philistines, who captured the shrine of Hebron in southern Judea from the Edomite clan of Caleb, but the Calebites ('Dog-men'), allies of the Israelite tribe of Judah, recovered it about the same time. These borrowings were later harmonized in the Pentateuch with a body of Semitic, Indo-European and Asianic myth which composed the religious traditions of the mixed Israelite confederacy.

In closing, we should note with a minimum of surprise, that the guardian tribe of the shrine of Hebron, the Calebites, were 'Dog-men'. Dogs are guardians, and preserve the secrets of the Dog Star Sirius, particularly as expressed in the ancient geodetic oracle octaves.

As for the Hittites, they were at Hebron – and only at that specific place in Palestine – because of its oracle centre. That is why they were 'sent by divine command' centuries later, presumably to reinforce that very place against the dangers of a turbulent time when Egyptian control under Akhenaten had collapsed.

## APPENDIX VII

# The Dogon Stages of Initiation

The following description of the Dogon system of graduated initiation into the mysteries of tribal religion is taken from *Le Renard pâle* by Marcel Griaule and Germaine Dieterlen.

The Dogon, who have classified everything, have established a layered hierarchy of their teachings they gave to the initiates. Their knowledge is staggered in four degrees, that are, in the order of their importance, the *giri so*, the *benne so*, the *bolo so* and the *so days*.

The *giri so*, 'word at face value', is the first knowledge implying simple explanations where the mythical characters are often disguised, their adventures simplified and invented, and are not linked together. It has to do with invisible deeds, concerning the ordinary rituals and materials.

The *benne so*, 'word on the side', includes 'the words in the *giri so*' and a thorough study of certain parts of the rites and representations. Their coordination only appears within the great divisions of learning which are not completely revealed.

The *bolo so*, 'word from behind', completes the preceding learning, on the one hand, and on the other hand furnishes the syntheses that apply to a vaster whole.

## APPENDIX VII

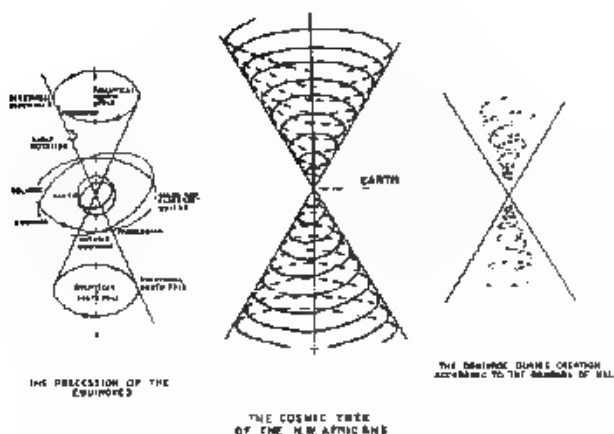
However, this stage does not yet include instruction in the truly secret parts of the tradition.

The *so dayi*, 'clear word', concerns the edifice of knowledge in its ordered complexity.

But initiation is not merely an accumulation of learning, nor even a philosophy, nor a way of thinking. It has an educational character, for it forms the individual, moulds him, as he assimilates the knowledge it imparts. It is more than that, because of its vital character; as it makes him understand the structure and system of the universe, it brings the initiate progressively towards a way of life which is as aware and complete as possible within his society in the world, as he was conceived and created by God.

Thus, a 'fourth dimension' is introduced into the life of the Dogon, peculiar to the myth and symbol which is as necessary to their existence as food and drink, in which they move with ease and flexibility, but also with the deep sense of the immanent presence of the invisible thing they are invoking. At a given moment, for such and such a ceremony, they know to what sequence of the myth and to

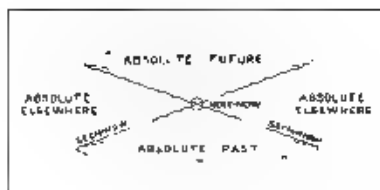
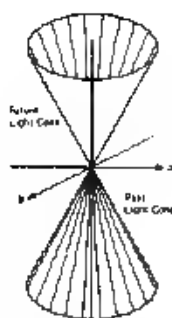
## THE SIRIUS MYSTERY



which connections (their) act belongs

*Figure 63.* The precession of the equinoxes is a phenomenon whereby the Earth spins slowly on its axis like a top once every 25,920 years. It is for this reason that people speak of the 'coming Age of Aquarius' since every two thousand years or so, the constellation that rises just before the Sun on the first day of spring (the Spring Equinox, as it is called) shifts. And soon the constellation of Aquarius will do this, replacing the constellation of Pisces. An interesting comparison may be drawn of a modern diagram of the precession of the Earth and a diagram drawn by a neighbouring tribe of the Dogon showing the Earth in a similar configuration, complete with indications of spinning above and below. They call it the 'Cosmic Tree'. The Bambara Tribe of Mali, immediate neighbours and cousins of the Dogon, and whose culture is also based upon the secret Sirius mystery knowledge, draw a similar diagram. For comparison I also give a scientific diagram showing 'light-cones' emanating from the Earth showing the restriction to our communication with the rest of the Universe imposed upon us by the finite velocity of light. (What this means is that if we send a signal to another star because it cannot arrive

## APPENDIX VII



instantaneously, its progress in time is depicted as travelling as a line on a cone rather than shooting out sideways as an instantaneous signal would have been shown.) And finally, as an extension of these concepts, a similar diagram of light cones shows how they represent the only future and past we can know—the regions outside the cones which we cannot reach because our communications are not instantaneous are forever an ‘absolute elsewhere’.

The latter two diagrams are given not because they have anything to do with the precession of the equinoxes, but because the African drawings may refer to light-cone concepts rather than to precession, especially as they are concerned with creation. Since creation is meant to have emanated from Sirius, unless there are instantaneous modes of communication in the ‘Anubis Cell’ (see Chapter One), such emanations would have had to travel no faster than the velocity of light, and would therefore be represented in a scientific diagram by a light cone. Consequently, the tribal drawings may preserve such knowledge. This information was left out of the original edition of *The Sirius Mystery* by the publisher, and I have restored it as I think readers will find it interesting. Like so much else which concerns the advanced knowledge preserved by these tribes, it would repay much further and deeper investigation.

## APPENDIX VIII

### A Note about Freemasonry

Due to the fact that a garbled account of myself, Sirius and the connection with Freemasonry has appeared in a recent book and contains some inaccuracies, I thought it best to put a correct account on record, lest any false impressions be too widely circulated. I have a very friendly acquaintance with Christopher Knight and Robert Lomas, whose second book *The Second Messiah* (Century, London, 1997) contains nearly a page about me (p. 216). Unfortunately, Chris and Bob did not inform me that they intended to publish anything about me and did not show it to me beforehand. Because they remembered a conversation with me imperfectly, the account contains several inaccuracies. For instance, they believe that only if I became a 33° Mason myself could I have held the further conversations about Sirius with the man who was my grandfather's Masonic protégé and who became Lieutenant Grand Commander (second highest ranking, immediately under Supreme Grand Commander) of the Supreme Council of Freemasonry in Washington (which is also the Mother Supreme Council of the World). This is inaccurate: he only wanted me to become 3° to commence the conversations, for only then does one 'become a Mason', going through the much higher degrees would, he said, be accelerated, but was not necessary to begin holding meaningful dialogue.



They also stated that I am a direct descendant of George Washington. As much as I admire old George, I have never claimed to be his descendant. My great great-grandfather John Leonard was at Washington's side for many years, and that is the person I mentioned to them. He was originally, as a very young man, a mounted dragoon under Major Bartholomaeus van Heer in 1776, along with his three brothers. The Leonard Brothers were exceptionally tall and phenomenally strong. They were excellent horsemen, and as a result of their background were among the handful of people fighting on the side of Washington who knew anything about being soldiers. They had one other advantage: they had grown up and had early military training in Hesse and were personally acquainted with some of the Hessian officers now fighting as mercenaries for the British, so that they could advise Washington on the personalities and tactics of his worst adversaries. The brothers were the sons of an English officer who had gone to Kassel in Hesse (called in those days 'Hesse-Cassel') as one of the commanders of the English expeditionary force sent to defend the Protestant cause under the Landgrave of Hesse against the assaults of the Austrians and other Catholics. Their parents appear to have died while the boys were youths, so instead of returning to England or Wales where their relations had iron mines in which they could hope for no personal share (being a younger branch of the Leonards of Herstmonceux Castle, who had originally opened iron mines in Sussex and were one of the few aristocratic families subsidizing their grand lifestyle by industry), the brothers made their way to America, where they had relations who had much earlier founded the first iron foundry in America (at Taunton, Massachusetts). They had an uncle, the Rev. Abiel Leonard, who happened to be the chaplain to a chap named George Washington in a spot of bother called the Revolutionary War. So they threw in their lot with their uncle. (A moving testimonial letter about the

Rev. Abiel Leonard survives in George Washington's published correspondence, saying that he kept up everyone's spirits during the terrible winter at Valley Forge, and without his encouragement Washington might not have stuck it out.) Washington selected eight of van Heer's dragoons to be his personal life guard, to ride surrounding him when travelling and to act as his bodyguards at all times, four of these eight were the Leonard Brothers. They were the last soldiers to leave Washington's side, parting with him only on the day of his inauguration as President of the United States, when his status changed from General to President. After that they retired as soldiers, and they were the last American Revolutionary soldiers to do so. They received grants of land in the new territory of Ohio, as did many others who had fought in the War.

Since *The Sirius Mystery* is concerned with teeth and with Greek heroes, I cannot refrain from mentioning a peculiarity of John Leonard which he shared with the mythological figure of Hercules. Hercules was reputed to have had, and John Leonard certainly had, a third set of teeth. Growing a third set of teeth in ancient times was meant to be a sign of a supernatural hero. As Edward Samson the dental historian has written: 'It is probably the tales of Hercules, half-god, half-man, which laid the foundation of the idea that men of more than usual strength would grow more than the usual two sets of teeth.' John Leonard was, coincidentally, abnormally large and physically strong, according to the information about him which survived within the family. So perhaps there is a very rare genetic syndrome whereby a man of abnormal size and strength with a third set of teeth occurs in the population, this could be part of the rational background to the lore concerning Hercules and Gilgamesh ('The hero, his teeth are the teeth of a dragon' as we have seen on p. 176 from a Sumerian account). My forebear was,

according to the family account, very depressed when his teeth starting falling out when he was in late middle age. But everyone was amazed when they were replaced by a completely new set! Dentists of whom I have enquired speculate that this happens to approximately one person out of every hundred million or so, being one of the rarest phenomena in the lore of human anatomy. In fact it seems to be much rarer than that, probably by a factor of ten or more. The irony regarding John Leonard is complete when we recall that George Washington's notoriously square jaw was not anatomically natural either but is known to have been the result of wearing a remarkable complete set of wooden false teeth — which still survive, apparently. But so much for teeth and heroic figures!

I am certain that the Leonard Brothers must have taken part in Masonic lodge meetings with George Washington, if only due to the fact that by virtue of their jobs they could not leave his side for years on end. Whether they were Masons before they came to America is something we will never know. However, my forebear's male descendants for two generations were, I believe, *all* senior Masons and Masters of Lodges in Pennsylvania and Ohio, where he settled after Washington's inauguration. Masonic comradeship appears to have been involved also in the close personal friendship between my forebear's (John Leonard's) grandson, George Washington Leonard, and Jefferson Davis, the President of the Confederate States of America, who was also a distant cousin of ours by marriage (through his wife and the Agnews).\*

\*

\* Since Abraham Lincoln's stepmother, a Johnston, was a distant relation of the Temples, a curiosity of history which might be mentioned is that I am one of perhaps half a dozen people alive who has connections by marriage with the presidents of the two opposing sides of the Civil War, between whom there are no other personal links.

Meanwhile, by a bizarre coincidence, a discontented Jew named Adam Mond and his equally discontented Christian wife Catherine Emmert left Kassel in Hesse for America in the 1830s to escape religious bigotry, where their son ended up in Ohio married to John Leonard's granddaughter. They were my great-grandparents. Their families had lived in the same German city, presumably unknown to one another, and had to travel to Ohio on the other side of the world to meet and marry. The Monds are well known in Britain, as Adam Mond's nephew settled in England and with his son Alfred (later Lord Melchett) founded the company ICI (Imperial Chemical Industries). The Monds changed their name in America to Miller to avoid anti-Semitism, as they settled in the most German and most anti-Semitic city in the United States at that time, Cincinnati. Now, this great grandfather was a 32° Mason ('Sublime Prince of the Royal Secret', to use the official title). (And this great grandmother was not content merely to be a Mason's wife; she was a pioneer in female Freemasonry, and she founded a lodge of her own for women (in America female Masonry is called The Order of the Eastern Star).

Meanwhile *another* family, the Temples, entered the scene, and they were all senior Masons as well, including my great-grandfather and his three brothers. All of my great-great uncles and great uncles of all these families were Masters of their lodges, several of them were 32° Masons, my Grandmother Temple was also Matron of her own (Eastern Star) lodge, and for good measure my mother was a member of Eastern Star though not very active. Another great-uncle, Charles Kitts, was a 32° Mason, and my great-aunt Sallie Miller Kitts was also Matron of her lodge. I am also descended from the Kyle family (including a Colonel under George Washington), and they were all senior Masons as well.

Rarely has anyone been born into such a welter of family

## APPENDIX VIII

Freemasonry I believe that amongst my immediate relations, there must have been at least a dozen 32° Masons, and at least thirty Masters and Matrons of lodges. And it is certainly true to say, as Knight and Lomas did, that my family have been prominent Masons for more than 200 years. In my dinner speech after my own initiation to the third degree I pointed out that the members of my family who had been Masons would, if they could all be called back to life again, exceed in number the large body of men present at the dinner

But to return more particularly to the story told by Knight and Lomas and how it relates to *The Sirius Mystery*. The most important Mason in my family from my point of view was my grandfather, who was also called Robert Temple. He was a 32° Mason and so highly respected in Masonry that he was asked to become a 33° Mason, which is the highest degree possible (called a Grand Inspector-General). This involves administration of the entire Movement in America as well as most of the world from the base called The Supreme Council and Mother Supreme Council of the World, at 1733 Sixteenth Street, NW, Washington, DC. However, he had to decline this invitation because it takes up so much time and in those days was also extremely expensive, and he had lost his money in the Great Depression. But he sponsored into Freemasonry a young man whom he liked very much called Ted Webber. And Ted Webber went on to become a very active and important 33° Mason, and a close friend and colleague of the Sovereign Grand Commander Henry Clausen, as well as of those other prominent 33° Masons, President Gerald Ford and American Astronaut Colonel 'Buzz' Aldrin, who carried a Scottish Rite flag to the Moon, emphasizing the interest the highest level of Freemasonry takes in worlds beyond our own.

So it was Charles E. ('Ted') Webber, not an elderly relative, who approached me about *The Sirius Mystery*.

Because I had moved to England, I did not see Ted as an adult until I made a visit to Virginia when I was in my thirties. Apart from my mother, all of my Masonic relatives were dead by then or were cousins whom I never saw. Ted knew that I had no obvious route into Masonry and did what Masons are not supposed to do, actually recruited me. Masons are only supposed to join if they seek to do so, never be persuaded. Although he felt 'fraternal loyalty' (to use Masonic terms) towards me, his reason was not sentimental but practical. He said quietly to me 'We are very interested in your book *The Sirius Mystery*. We realize you have written this without any knowledge of the traditions of Masonry, and you may not be aware of this, but you have made some discoveries which relate to the most central Masonic traditions at a high level, including some things that none of us ever knew. We would very much like to get you to exchange some ideas and research with some of the people in our headquarters. But unfortunately because you are not a Mason we cannot discuss any of these matters with you, as it is forbidden.' I asked him what sort of connection there was and he did mention specifically that it was my work on ancient Egypt, on Isis and Osiris, and the ancient traditions of the star Sirius.

Ted asked me if I would like to become a Mason, and if so, he would arrange it immediately. 'After you pass through what we call the three degrees, which is the basic initiation, you become an official Mason, and then we will be able to talk with you about these things, which we cannot do until then.' So, out of curiosity and a vague family sentimentality, and because I liked Ted so much, I agreed reluctantly to become a Mason, despite the fact that it was against my nature to want to be part of a secret society. I would never have sought it on my own initiative.

Ted wrote to Commander M. B. S. Higham, RN, Grand Secretary of the Grand Lodge of England in London on 23 August 1984, saying 'I have known the Temples family for

## APPENDIX VIII

more than fifty years. They are very loyal American citizens. Robert has been living in England for a number of years and has published a number of books. I will appreciate it very much if you will have some of your brethren get in touch with him. He requested that I be admitted immediately as a candidate for initiation at the lodge nearest to me, without any sponsor. I believe this was practically unprecedented, and well might one imagine the astonishment of the local lodge who contacted me and said they had had a request for my admission from Brother Higham—a man whose name is known from Masonic circulars but no one ever seems to meet him.

It takes some time to go through the three separate initiation ceremonies called the three degrees, as several months have to elapse between each one. It was a year and a half or two years before I completed this. At the end I was given a certificate pronouncing me a 'Master Mason', which sounds a very grand term but merely means you have gone through the basic initiations. In Masonic correspondence, I can now sign myself 'Robert Temple, 3<sup>o</sup>', by way of identifying my status, if corresponding with, say, a really important Mason or making clear I am not still just a candidate. I discovered that the vast majority of Masons know nothing whatever of the higher degrees of Masonry, and are never invited to attain to them. Some vaguely know that what are called 'Mark Masons'—a separate order within the movement where, I was told, a great deal of beer-drinking takes place—is also a fourth degree. But few Masons seem to be intellectuals pursuing ancient mysteries—most of them seem content with jolly dinners, collections for charity, and fraternizing with one another in a hearty manner. By the time I had become eligible for conversation on 'Sirius' matters, Ted was pretty aged and I never returned to Virginia. So no further discussions on these issues ever happened. Ted died, a pillar of his community and of American and World

Scottish Rite Freemasonry, noted for his rectitude and kindness. And that was that I haven't been to any further lodge meetings.

Knight and Lomas have done a good job of demonstrating what many people including myself had long assumed, that Freemasonry is directly descended from, and is a continuation of, the Knights Templar. Although the Knights Templar were suppressed in England and France, they continued in Scotland (hence 'the Scottish Rite', manuscript records of sixteenth-century Scottish lodge meetings survive) and by the seventeenth-century spread back into England again. English Freemasonry likes to pretend that the Masonic Movement was founded in 1717, but that can be proved to be complete nonsense.

As for the Sirius mystery and Freemasonry, there are some further speculations. After the publication of my book, various people wrote to me and asked me whether I knew the writings of Alice Bailey, who produced many volumes of mystical works supposedly inspired by 'Higher Beings', communicated to her in trance. Much of what she wrote concerned a kind of cosmic Freemasonry. I had no familiarity with this material but tried to look into it. My friend, the late Sir John Sinclair, Bart., had met Alice Bailey as a child and was involved in her literary estate through something called the Lucis Trust. He attempted to search for Sirius references for me. I discovered that Miss Bailey had maintained that 'the Great White Lodge' of Freemasonry was based at the Sirius System, and that it is always beaming helpful rays to the poor people of Earth who wallow in appalling ignorance, violence, and oppression. We earthlings are looked upon as a dangerous lot, and the Sirians have tried hard to civilize us without much success. Freemasonry is meant to be one of their civilizing forces here. (Of course the corrupt Masonic lodges such as the P-2 of Italy would form no part of this.)



## APPENDIX VIII

Amongst material handed to me by John before he died, not all of it by Alice Bailey, and much of it odd photocopied pages without proper referencing information, I find comments such as these:

Each star in the heavens is a solar system with a light producing sun and revolving planets. Our solar system in which our Earth exists is one of them. There are millions of stars but, among them all, only the star Sirius has a direct link with the Earth and with humanity. Much was known to the Ancients about Sirius, now largely lost but recoverable. Masonic tradition has it that the first three degrees of our Blue Lodge [I haven't the faintest idea what the Blue Lodge is] are equivalent to the first degree of Freemasonry on the star Sirius. Pondering upon the implications of this statement is fascinating because it lifts the whole concept of Masonry as a spiritual quest on to a higher plane than ever known before. It gives meaning and depth to the question 'Why Masonry?' It will be no detriment to Masonry if we use the 'as if' technique of philosophy which does not hesitate to deal with that which is as yet unproven. More Masons are asking more fundamental questions about Masonry these days. Among such questions is: Where did Masonry originate? Because the star Sirius is older than the Earth, Masonry could have existed there long before our Earth. Masonry began. By implication there is human life on Sirius. Our solar system receives energy from three main sources. There are three great waves of energy which sweep cyclically through our solar system, one of which comes from Sirius.

There are seven paths of progress open to man when he has learned all that human evolution on Earth can teach him. One is the path to Sirius. He arrives there in consciousness as a perfected human being. It follows that

there is therefore a type of life on Sirius which includes the essential of human life on Earth. This includes Masonry and he finds that great spiritual fraternity already there. Life on Sirius is therefore the destiny of the majority of humanity who then, if they are Masons, continue as Masons. Great as Masonry has been in the past, it has before it a still more glorious and useful future as it moves from Speculative to Spiritual Masonry. That inevitable change is already dimly seen. It will be more important than the change from Operative to Speculative Masonry. It is towards this end that Masonic Research should direct its efforts.

I don't know whether Alice Bailey herself actually wrote that. But she certainly wrote the following:

One great fact to be borne in mind is that the initiations of the planet or of the solar system are but the preparatory initiations of admission into the greater Lodge on Sirius.

The first four initiations of the solar system correspond to the four 'initiations of the Threshold', prior to the first cosmic initiation. The fifth initiation corresponds to the first cosmic initiation, that of 'entered apprentice' in Masonry; and makes a Master an 'entered apprentice' of the Lodge on Sirius. The sixth initiation is analogous to the second degree in Masonry, whilst the seventh initiation makes the Adept a Master Mason of the Brotherhood on Sirius.

A Master, therefore, is one who has taken the seventh planetary initiation, the fifth solar initiation, and the first Sirian or cosmic initiation.<sup>2</sup>

Alice Bailey also said quite explicitly: "in the secret of the sun Sirius are hidden the facts of our cosmic evolution, and incidentally, therefore, of our solar system."<sup>3</sup> This might

## APPENDIX VIII

almost serve as a motto for my own book. And yet these insights reached Miss Bailey by means of some strange 'automatic writing' which she apparently produced, like someone in trance. And I only found out about it after I worked my own way along what might be called by the Hindus 'the path of knowledge'; Miss Bailey seems to have taken some kind of short-cut.

In the light of this information, perhaps the interest shown by one of the leaders of worldwide Masonry in my research can readily be understood. Whether it is true is not the point, the point is that it is claimed to be true, thus it means that mystical Masons would naturally take an interest in my findings. It is ironical that all of this was in print while I was writing my book and I knew nothing whatever about it. I still don't know that much about it, but I thought I at least ought to mention it.

### Notes

- 1 Samson, Edward, *The Immortal Tooth*, John Lane The Bodley Head, London, 1939 pp 188-93. Samson points out that the rarity of cases of three sets of teeth is such that it is one of the great enigmas, and dentists are still trying to find a modern example in order to be able to study what it is that is really happening when this takes place. With regard to my forebear I must stress that he grew a complete third set after the second fell out, and therefore the third set was not a survival of 'baby teeth coming to the fore' or instances of tumours or anything of that kind. I only wish he were alive today so that he could be x-rayed and properly studied!
- 2 Bailey Alice A., *Initiation. Human and Solar*. Lucis Publishing Company New York, and Lucis Press, England, no date given, pp 17-18.
- 3 Ibid. p. 68.

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## Notes to the Plates

*Plate 1* The scientific achievement represented by this extraordinary photograph is considerable. Until 1970, no photographic record of the small white dwarf star Sirius B existed, despite attempts over several decades to obtain one. With much ingenuity, Dr Irving W. Lindenblad of the US Naval Observatory in Washington, D.C., finally devised a technique which made this photograph possible. Lindenblad (1970; see Bibliography) says: '... simultaneous observation of Sirius A and B by conventional photography has always presented a problem due to the small separation and large magnitude difference between the components, and because of various emulsion effects.' Since Sirius A is enormously brighter than Sirius B, it is easily understood that it washes out the smaller star which orbits it. How, then, to photograph the smaller star at all?

Dr Paul Murdin, then of the Royal Greenwich Observatory, provided some explanatory notes on Lindenblad's photograph and gave his permission for me to quote them here:

The six spikes on Sirius A are caused by the hexagon used on the front of the telescope. The point of making the photo in this way is that Sirius A is about 100 times as



bright as Sirius B so that its light tends to spread out over Sirius B rendering it invisible. By using a hexagonal lens (actually a twenty-six inch circular lens with a hexagonal mask) in his telescope, Lindenblad was able to compress the star image in certain directions; he chose the orientation of the hexagon so that Sirius B's image fell in one of the compressed zones and was thus able to be seen.

The wire grating referred to by Lindenblad makes the small images of Sirius A on either side of the bright one (there are small images of B too, but they are too small to be visible). The point of this is that the bright image of Sirius A (the 'zero order' image) is so big that Lindenblad couldn't measure the position of Sirius B with respect to A. He made first and second order images, measured B with respect to them and was able to *calculate* where B was with respect to the zero order image of A.

These calculations enabled Lindenblad to angle his hexagonal aperture so that Sirius B would 'hit' a depressed area of Sirius's light — a dip where the light was teased inwards, and Sirius B could peek through. But it could only peek through if Lindenblad had first found it! The reader can by this point appreciate how clever Lindenblad had to be in order to achieve any results at all. However, these were not all of his problems. There was a serious emulsion contraction effect for the photograph, with such close images. Lindenblad said in 1970: 'The important correction to the separation of the components of Sirius due to emulsion contraction, or the Ross (1924) effect, depended, in van Albada's method, upon measurements of second-order [images]. However, this procedure could not be employed in the present work because the dispersion affecting the second-order images generally rendered them unmeasurable. Consequently, another technique for determining the emulsion contraction was devised.'

This is a perfect example of technological feats taking place constantly behind the scenes in order to produce results which the public then take for granted, with no appreciation of the difficulties involved. The story behind this photograph is part of the saga of the attempt to unravel the mysteries of Sirius. So loth has Sirius been to give up her secrets that she has denied us even this photograph until 1970. All the more reason to wonder at the Dogon, who, oblivious of our scientific labours, have always drawn pictures of Sirias in the sand, with its companion – nothing to it!

*Plate 14* Top left The beautiful omphalos stone found at Delphi in Greece, covered in the mesh thought to symbolize the latitudinal and longitudinal grid on the Earth. (For an exhaustive treatment of that theory, see *Secrets of the Great Pyramid* by Tompkins and Stecchini, particularly Appendix by Stecchini.)

*Plate 15* The superb omphalos stone discovered at Delos, which incorporates the Delian palm design. (Reproduced in W. H. Roscher, *Neue Omphalosstudien*, Leipzig, 1915.)

*Plate 16:* Relief discovered at Miletus in Asia Minor. The figure of Apollo is resting on an omphalos stone (and an actual omphalos stone has also been discovered at Miletus) covered in mesh, while a second, smaller omphalos stone with a serpent is seen in foreground. The palm is prominent here again. Miletus is on the same parallel as Delos, and the palm is the 'tree-code' for that latitude in the oracle octaves schema. Delos is the western centre and Miletus is the eastern centre at  $37^{\circ}30'$ . The nearby site of Branchidae (also known as Didyma) to the south seems to have adopted the oracular functions presumably associated with Miletus itself originally. This relief appears as Figure 101 (the last in the volume), page 411, of *Das Delphinion in Milet* by Georg Kawerau and Albert Rehm. Berlin, 1914. Roscher also reproduced it. Kawerau and Rehm say with relation to it

(page 410): 'We have already noted here in later periods the distinctive likeness of Pythian Apollo which is universally known, and there is nothing extraordinary in finding this cult image of the Delphinion, the omphalos-and-serpent'

*Plate 17* Two Babylonian altars to the god Anu which bear what appear to be omphali

*Plate 18* A bas relief in white marble of the Delos omphalos stone, excavated on the Island of Delos in a hall of a house adjacent to the so-called House of Dionysius. The oracular serpent is entwined around the omphalos stone, flanked by a palm tree on either side.

*Plate 19* Another Egyptian omphalos marker reproduced from Tompkins and Stecchini (see Bibliography)

*Plate 21* Top left Votive relief of fifth century BC from Sparta, Apollo and Artemis, between them an omphalos flanked by two doves with their heads turned away in the customary manner for these scenes. (From Plate VII, No. 4, of W. H. Roscher, *Omphalos*, Leipzig, 1913.)

Top right Votive relief from Aigina, showing omphalos with two doves, their heads turned away (From Plate VIII, No. 3, of W. H. Roscher, *Omphalos*, Leipzig, 1913.)

Top coin Coin from Delphi showing Apollo sitting on the omphalos stone and leaning on his lyre. He holds a laurel branch, which is the 'tree-code' for Delphi. Note the clear differentiation of trees in this compared with the earlier Delos and Miletus examples of Plates 15 and 16; at Delphi the laurel is appropriately shown, whereas Delos and Miletus display the palm. This coin is from Imhooff Blumer's *A Numismatic Commentary on Pausanias*

Below Apollo Two further examples of omphali on ancient coins, with serpents and geodetic mesh visible, both in British Museum. One is from Delphi and the other from Pergamum.

Two bottom coins Two coins from Delphi showing the entrance to the Temple of Apollo in ancient times. The letter

'E' hangs suspended in the entrance way; it is the second vowel, and Delphi is the second oracle centre in descending order (the ancient octave was taken as descending rather than as ascending – the ignorance of which fact has led many modern experts astray when trying to unravel the complexities of Pythagorean harmonic theory). These two coins may also be found reproduced in Imhooff-Blumer (above). The second of these coins is to be found in the Copenhagen Museum, while the first was in Dr Imhooff-Blumer's private collection in the last century, and its fate today is unknown to this author.

*Plate 22:* Painting from ancient vase in the Etruscan Museum, Rome. Jason apparently being vomited forth by the serpent/dragon, rests on the serpent's teeth. 'Serpent's tooth' is euphemism for Sirius (see Chapter Eight). Looking on is a female figure in serpent-headed robes, holding an oracular dove, she may be Medea or a goddess. In the background the golden fleece is seen suspended in the grove guarded by the serpent. Note that the breastplate of the female figure, on which is a fanged Gorgon's face, is composed of scales identical to those of the serpent/dragon. On her helmet is the Greek sphinx (a mythological being associated with Greek Thebes). Though the elements can here be identified in this way, the story implied by them cannot so easily be unravelled. The author has not been able to learn the mythological incidents referred to in this curious vase. The female figure most nearly resembles the goddess Athena, but what is the incident, why does she hold a dove, why is there a sphinx on her helmet, and why do serpents issue from the folds of her garment? The scene is very mysterious.

*Plate 23:* This is one of the most interesting cylinder seals to survive from the Babylonian culture. It is reproduced in Henri Frankfort, *Cylinder Seals*, Plate XX, and in *Sumerian Mythology*, Plate XII, by Samuel Noah Kramer, where

Kramer says of it: 'two gods are guiding a plow, which is perhaps drawn by a lion and a wormlike dragon.' Frankfort says of it: 'Two gods plowing; one holding a plow, the other driving span (consisting of snake-like dragon and lion) with left hand, which either holds or is shaped like a scorpion, bird, eight-pointed star, and crescent in field.' It is Plate 62 in Frankfort's later book *Stratified Cylinder Seals*. It is Akkadian style, Late Agade period in date.

This cylinder seal is such an important item of evidence that it requires extended comment. The lion is the earth-lion well known as the earth goddess's symbol from the ancient Near East. (See, for instance, *The Syrian Goddess* by Strong and Garstang.) But note that directly beneath the symbol of a star, ploughing is taking place, and leading right down to the plough blade is the strange form of a serpent-like dragon. It looks almost as if the mouth of the serpent/dragon is being ploughed into the ground. And this, I suspect, is exactly what is intended. For what seems to be represented is the act of ploughing and sowing the serpent's teeth, which we know to be a hieroglyphic pun in Egyptian for 'the goddess Sirius', we also know that the growing up from the ground of the 'serpent's teeth' is another pun for the rising over the horizon of the star for which 'serpent's tooth' is the other meaning, i.e. Sirius. Its once-yearly rising was the basis of the Egyptian calendar.

If we assume this to be the case, the figure whose hand has become a scorpion can be explained. Obviously, the constellation Scorpio is intended, which is approximately a third of the sky 'round' from Sirius. From the ancient Greek astronomical writer Aratus, we know that when Scorpio rises, it chases Sirius and Orion away below the horizon. He describes it as follows (*Phaenomena* 634-80)

The winding River (the constellation Eridanus near Orion) will straightaway sink in fair flowing ocean at the

coming of Scorpio, whose rising puts to flight even the mighty Orion. Wherefore, too, men say that at the rising of the Scorpion in the East Orion flees at the Western verge. . . what time all the rays of the mighty Dog (Sirius is in this constellation) are sinking and all of Orion setting, yea, all the Hare (the constellations Lepus), which the Dog pursues in an unending race.

The disappearance below the western horizon, then, of the 'serpent's tooth' (Sirius) which is going into the ground (to 'grow up' from it again in seventy days' time at its heliacal rising) seems to be indicated here, for the figure representing the sky has had his left hand (the east) become Scorpio, while his right hand (the west) is swallowing the 'serpent's tooth'. Over this proceeding of the setting of Sirius presides, as would be expected, the earth-lion itself which pulls the plough that makes the furrows (three of which are visible) into which will be swallowed that fast-disappearing star just above the plough-blade. The crescent may be taken as an indication of the waning of the light of the star almost to vanishing point – not surprising, as the moon is a 'front man' for Sirius in many myths. (Kramer thought, because of the ploughing, that this scene involved 'gods of vegetation'.)

*Plate 24* The ram is in the crucible, its fleece presumably being transmuted into gold in what we would call an alchemical sense. Was there such a thing as alchemy at this time in history? Perhaps the attempt to transmute base materials into gold is an ageless concept, and in antiquity it could have been less concerned with chemistry and more with symbolism, as I suspect is the intention here.

*Plate 25* In the centre, the sun god Shamash who has flames emanating from his arms and shoulders, is seen stepping over the horizon from between the two mountains-of-the-rising-sun called Mashu. The name Mashu has long been recognized as a non-Babylonian foreign word, and I

have proposed that it is Egyptian, *ma Shu*, meaning 'Behold the Sun God' (see my book *He Who Saw Everything A Verse Translation of the Epic of Gilgamesh*). To either side of the Mashu peaks are the cosmic portals topped by rampant lions which have been opened by divine attendants, the lions top prominent door hinges, which were of esoteric cosmological importance. The sun god faces, to his right the star Sirius, which has just risen. It is depicted on the end of an arrow placed in a bow, as Arrow Star or Bow Star, which were the Babylonian, Assyrian and Persian names for Sirius.

*Plate 27:* Zeus had become enamoured of Io, a Greek mythological figure derived from the Egyptian goddesses Isis and Hathor (who had become amalgamated in Greek eyes), but his wife Hera was jealous. Zeus transformed Io into a heifer (the Egyptian Hathor was symbolised by a cow). But Hera set Argus to watch over her since he had so many eyes she could never escape his scrutiny. Hence Zeus wished Argus to be disposed of. Io was said to be the ancestress of Aegyptus (representing the Egyptians), who had fifty sons, and Danaus (of Argos in Greece), who had fifty daughters, the fifty boys married the fifty girls, thus reconstituting the number of one hundred, and matching the number of Argus's eyes. After Argus's death, his eyes were placed by Hera on the tail of the peacock. Of the 50 Egyptian boys, 49 were murdered on their wedding night, and the one remaining became the ancestor of the royal family of Argos.

*Plate 31* The similarity between this and the Chinese bas relief depicted in Figure 50 is striking and suggests a common origin for the design motif. Reproduced from 'Monuments Relatif au Culte d'Isis a Cyzique' in the *Revue Archeologique*, Paris, Vol. 5, May 1879, Plate IX. These objects at that time were in the personal collection of M. A. Mordmann, Jr., of Paris. Isis wears on her head the horns of a cow (symbolising the moon phases adopted from the goddess Hathor) and a disc surmounted by a lotus. Serapis wears on his head the

*kalathos*, the sacred basket or bucket traditionally carried by the amphibians Oannes and Dagon.

*Plates 40 and 41* The identification is found in the classical *Encyclopaedia* of Pauly-Wissowa under 'Proclus'. The bust is in the Athens Museum, and may be found reproduced (though unidentified) in Gerhart Rodenwaldt *Griechische Porträts*. Rodenwaldt also reproduces photographs of front and side view of a bust later identified as being that of the earlier Neo-platonist philosopher Iamblichus.



# Index

## NOTES

- 1 *Italicised numbers* indicate illustrations, maps and charts. There are occasionally textual references on the same pages
2. Plates are indicated by *Pt.* (for black and white) and *CP* (for colour). These references are separated from page numbers by a *semi-colon*
- 3 The suffix *n* after a page indicates a footnote

*Aakhu-t* 392, 424

Aar t 393

Aārārut/ Aruru (deity) 393

Aboukir (Al Bekūr) 240

*see also* Canopus (city)

Abraham 91, 273, 556

and Hittites 584, 587, 588-9

Abasir 258

Abydenus 415, 417-420, 549-51

Abydos 132

Abzu / Apsu (Sumerian Ark)  
49, 427, 452

acacia (*sewe*) 106, 293, 295, 299

Actaeon *see* Akta on

Adam 589-91

Aea (Colchis) 213, 218-19, 225,  
249, 259, 273, 293, 361

Aeetes, King of Colchis 212,  
219, 227

Aegyptos, King of Egypt and  
his fifty sons 196, 343-6,  
357

Aeschylus 279, 281

Africa 63-4

*see also* Akan people, Dogon  
people; Libya

Agastya *see* Canopus (star)

Agenor 341, 347

Agga (deity) *see* Anubis

# THE SIRIUS MYSTERY

- Ahriman (Arimanius) 383-4  
 Ahura Mazda (Oromazes) 283, 382-3  
 Aitken, Robert G. 115, 385-6  
 el Ajal, Wadi 397  
 Akan people (Ghana) 331-2, 334, 353-4  
 Akhenaten, King of Egypt 277, 285-8, 301, 586  
 Akhet-Aten (city) 286  
 Akkadians 90-1  
   *see also under* Sumerians  
 Akuaon (deity) 222-3, 226, 227, 228, 236  
 Aldred, Cyril 285-7  
 Alexander the Great 211, 240, 298, 318, 413  
 Alexander Polyhistor *see* Polyhistor  
 Alexandria 343, 355, 58  
 aliens *see* intelligent life  
 Allen, Herbert J. 437, 473  
 Allen, Richard H. 137-138-9, 229-30, 240-4, 248, 381  
 el-Amarna, Tell 286  
 Amen-Ra *see* Amon  
 Amerindians and French explorers 88-9  
 Anma (deity) 105, 107, 109-10, 114, 479  
   as Amon 444, 449, 461-464  
 Amon/Amonon/Amen-Ra (deity) 274, 278, 286-7, 288, 289, 301  
   Anma as 444, 449, 461, 464  
   oracle of *see* Siwa  
 amphibians 52-3, 406-75  
   Chinese 435-41, 442-3, 444, 574-5, 643  
   and Dragons *see* Nommos  
   table 409, 3  
   Greek *Pl.* 29, 280, 421-32;  
     *see also* Nereus. Typhon  
   repulsive 413, 417-18, 463, 553  
   Sumerian/Babylonian 55, 90-1, 426-7, 552-4, 562-3  
   *see also* Fuxi, intelligent life;  
     Oannes. Triton, water  
 An (city, later Heliopolis) 134, 376  
 An/Anu (heaven/deity and great god) 194  
   and Anubis 141-3  
   and Bow Star 188-9  
   children of 203, 235, *see also* Anunnaki  
   and Cronos 145  
   heavy star essence 184, 186-8, 201, 202  
   as Jackal, 141, 163-4  
   and Ka (*an-kr*) 206  
   omphalos *Pl.* 17, 639  
   Osiris as 142  
   sons of *see* Anunnaki  
 Andromeda 34, 2  
 animals *see* birds, cow, crocodile, dog, dolphins; hare, jackal, pale fox, serpents, sheep, wolf

# INDEX

- An-ki* (heaven-earth) 148
- Annedot* 416-17, 427, 439.  
549; *see also* *Nommos*,  
*Oannes*
- Anpu* 141, 203, 235
- An-pu* (deity) 141, 203; *see also*  
*Anubis*
- Anpu-hursag* ('Anubis of the  
Hill') 180, 182, 201, 376,  
379
- Anti-Kythera shipwreck* 69,  
262
- Antoninus* 342
- Anu* (deity) *see* *An*
- Anubis Cell and Field* 43-5,  
594, 595
- Anubis* (deity)  
as *Agga* 285 as dog/ *ackal*  
135, 162, 164, 345, 376  
and *Anpu* 141, 203, 235  
*Cerberus* and 336, 337, 357  
and eyesight 424  
and *Isis* 164  
and *Sphinx* 17, 32, 424-5  
as embalmer of mummies  
191, 340  
as face of dead 143  
as *Hermes* 17, 200  
and light and dark 135, 282  
and *Nephthys* 135, 146, 162,  
164, 424  
'of the Hill' *see* *Anpu-hursag*  
as orbit of *Sirius B* 142, 143,  
146, 340, 379, 392, 394,  
403  
as *Osiris* 135, 145-6, 162-3  
*Plutarch* on 134-6, 142, 145,  
147, 162, 164  
sceptre of 375  
as time/circle 143-4, 145,  
162, 164  
*see also* *Osiris*
- Anukis* (deity) and celestial  
boat 135, 137, 139, 188,  
206, 227
- Anunnaki* (deities) 178, 199  
and *An/Anu* 141, 174  
and *Bow Star* 188, 189-90  
as counterparts of *Argonauts*  
181  
and *Enki* 203, 205-6  
as *Igig* 190  
and *Marduk* 194  
sister (*Bar*) 203, 235  
as underworld gods 189-90,  
238  
*see also* under *thrones*
- An-Yang/Anyang* (city) 276  
292
- Apep* (monster) 195
- Aphrodite* (deity, *Venus*) 258,  
261, 295
- Apis* the Bull (deity) 143, 232
- Apollo* (deity) 146, 196, 230,  
335  
bird of 220  
birth of 295  
and *E* 580  
and *Horus* 255  
*Phoebus*- 266

# THE SIRIUS MYSTERY

portrayed *Pt 21* 639  
 as prophet of Zeus 262-3  
 wolflike 344-5  
*see also under* Delos; Delphi  
 Apollodorus 260, 349, 415,  
 420, 472, 549  
 Apollonius Rhodius 178, 211,  
 326, 429  
 Apsu *see* Abzu  
 Aptya *see* Tita  
 Apuleius 565-6, 578  
 Aquarius (constellation) 594  
 Arabs 91, 138, 373  
 Arachnaeon 280  
 Ararat, Mount 273, 283, 294  
     and Dodona on same  
         latitude 246, 248  
     and Hittites 588  
     location 259  
     Noah lands on 208, 239,  
         244-6, 281, 299, 301  
     photograph of *Pt 12*  
     *see also* Metsamor  
 Aratos/Aratus of Soli 125, 138,  
 240, 641-2  
 Arcadia 345  
 Arcturus River (*later* Phasis)  
 219, 380-1  
 Arcturus (star) 381  
 Arecibo (Puerto Rico)  
     telescope 80  
 Areimaneus/Ahriman 382-4  
 Ares *see* Mars/Ares (deity)  
 Argha (Hindu boat) 243  
 Argope (Telephassa) 347

*Argo* (boat) and Jason's search  
     for Golden Fleece 176-7  
         236, 273  
     and birds 244  
     builder of *see* Argus  
         (builder  
         character of Jason 227  
         cybernetic oak timber on keel  
         *Pt 26*; 148, 165, 180, 248,  
         272  
     and Danaos and offspring  
         139, 163, 346, 357  
     destination *see* Colchis  
     and fifty 139, 140, 163  
     Gilgamesh and 174-5, 355  
     and Hercules *see under*  
         Hercules  
     and Isis 139, 147, 163  
     Jason and Medea depicted  
         *Pt 22, 24*;  
     in *Odyssey* 148, 212, 213  
     and Osiris 139  
     teeth sown by Jason *see under*  
         teeth  
     *see also* Argonauts, Colchis;  
         protection of *Argo*  
*Argo* (constellation) 33-4, 129,  
 137, 247  
     stars *see* Canopus (star);  
         Wazn  
 Argonauts, fifty 139-40, 163,  
 196, 249, 344  
     and Colchis 208-13  
     as counterparts of Anunnaki  
         181

- and Dogon 332, 387  
 and Gilgamesh 175, 199  
 and Isis 147  
 in Libya *see* Garamantians  
 as Minyae 177-8, 208, 209,  
   210, 216, 221-2  
 origin disputed 212, 216  
 Sumerian antecedents 174-5  
 and Triton 428-9  
*see also* *Argo*
- Argos (city) 280, 342, 344, 346  
 Argus (builder of *Argo*) *Pf* 26,  
   230, 342  
 Argus (hundred-eyed monster)  
   *Pf* 27-364, 365, 371, 401,  
   643  
 Argus (Odysseus' dog) 362  
   363, 364, 401  
 Aries (ram) 229-30  
 Aristarchos/Aristarchus of  
   Samos 519-21, 522  
 Aristophanes 422-3  
 Aristotle 145, 165, 220, 242n,  
   271, 326, 346, 353, 391,  
   512  
 Arks  
   and birds 244, 288, 291, 381,  
   590  
   Greek *see* Deukalion  
   Hebrew *see* Noah  
   Nommos' arrival in *see*  
     arrival under Nommos  
     space' 52  
   Sumerian 427  
   words for 363-70, 380-1,  
     40, 402  
     *see also* celestial boats,  
     Deuge
- Armenia 146, 556; *see also*  
   Acarat; Hittites
- Arrou 477, 482-4, 495  
 arg/argi 364-8, 380, 401, 402  
 arrow *see* bow (and arrow)
- Artemis (deity, Diana) *Pf* 27  
   223, 226, 295, 331, 335,  
   639
- Arucris (Elder Horus, deity)  
   433, 473
- Aruru (deity) 393, *see also*  
   Ninhursag
- Aryans 231, 363, 382, 426
- Asar-Hep *see* Serapis
- As-Ar/Asar/Asaru (deity)  
   131-3, 194-5, 232
- Ascalon (Syria) 262
- Asclepius-Imuth (deity) *see*  
   Imhotep
- Ashur-banipal, King of Assyria  
   142
- Ashurnasirpal, King of Assyria  
   276
- Aspect, Alain. Experiment 59
- Assyrians 90, 415
- Asi/asi 130-3, 392, *see also* Isis
- Atalanta 211&n
- Athena/Arhene/Pallas Athene  
   (deity) 248-9  
   and *Argo*'s navigation *see*  
     cybernetic oak under *Argo*
- Athena Pronaia 266

# THE SIRIUS MYSTERY

- Athene of Lundus 347  
 birthplace (Lake Triton)  
     265, 295, 333, 426  
 and Cecrops 422  
 and Danaos 344  
 fifty Pallantids 335, 357  
 and Isis 147, 148, 165  
 as Onga 349  
 Athens 346, 421-2, 506  
 'Atlantis' theories 18, 21-3, 32  
*au*  
 Aubrey, John 108, 298  
 Auriga (constellation) 229  
 autochthonous *see* 'earth-born'
- Baal (deity) *see* Bel  
 Babbitt, Frank C. 136, 145,  
     146, 579-80, 583  
 Babel, Tower of 551  
 Babylonians *see* Sumerians and  
     Babylonians  
*bado rite* 100  
 Bailey, Alec 604-7  
 Bamako people 91  
 Bambara people 92, 476, 477,  
     498-9, 594  
 Bambyce *see* Hierapolis  
 Barbera, André 36, 57  
 Barce/Barca *see* Marj  
 Baring, Robin 391  
 basket, sacred *see under* Oannes  
 Bau (deity) 203, 235  
 Bauval, Robert 5, 34, 56  
 beacon-signalling system 279-  
     81
- Bebon *see* Typhon  
 beer drinking 479-482, 3, 500  
 beginning 380  
 Behdet and oracle octave 253,  
     273-4, 282, 283-4, 294-5  
 and Antonius 342  
 geodetic projection from *see*  
     projection of *Argo*  
 later *see* *see* Canopus (city)  
 location 241, 241n, 252, 259,  
     299  
*see also* prime meridian under  
     latitude
- Bel/Belus/Baal (deity) 349,  
     419, 553-4, 558  
 Benard Cells 42  
 Benardete, Seth 330-1  
 Benest, Daniel 4, 47, 56, 82  
 Berbers 329-332  
 Berossus/Berosus. *Babylonian*  
     *History* fragments 248,  
     413-20, 461, 472, 548-59  
     from Abvdemus 549-51  
     from Alexander Polyhistor  
     551-6  
     from Apollodorus 548-9  
     from Josephus and others  
     556-9  
 Bible 223, 224, 384-387, 402  
     and Hittites 585, 589, 590  
 binary numbers 435  
 binary systems *see* duality  
 Binou, sanctuary of 571  
 birds 290  
     and Arks 244, 288, 291, 381,

# INDEX

- 550  
as hieroglyphs for latitude  
and longitude 291  
and omphalos *Pl* 33, 276,  
278, 279, 639  
sacrificial cocks 146  
*see also* dove; hawk/falcon
- black  
acacia 293'  
'Black Rite' *see* 'Dark  
Mystery'  
deity, Osiris as 153, 165  
doves 288, 290, 395  
headed/black-footed  
people 192 3, 209, 212,  
343  
-skinned people 289  
*see also in particular* Akan,  
Bambara; Bozo; Dogon  
and white 293  
*see also* darkness
- Black Sea (Euxine) 208, 269-  
70;  
*see also* Colchis, Hellespont
- blankets, ritual 503
- blood, circulation of 108, 112,  
281
- boats 215, 289  
shipwreck 69, 262  
*see also* *Argo*; Arks, celestial  
boats; Magan-boats;  
oarsmen
- body parts, significant *see*  
bones, eyes, heads,  
intestines; omphalos;
- placenta; teeth
- Boeotia (Greece) 322, 347-350,  
428, *see also* Orchomenos
- bones  
iron as 147, 378  
lodestone as 147-8, 378  
thrown by Deukalion to  
repeople Earth 180, 221  
256, 327, 350  
*see also* repopulation, stones;  
teeth
- bow (and arrow) 137, 139, 375
- Bow Star, Sirius as 139-188-9,  
223, 226, 236, 375, 402
- Bozo people 132, 161, 476, 500
- Bracewell, R N 84-5
- Bran/Phorontus (deity) and  
fifty maidens 324
- Branchidae *see* Didyma
- Briareus (monster) 212, 325-9,  
356
- brick buildings 207
- bright, words meaning 195-6
- Brihaspati (Vrihaspati) 567
- Brown, Robert 253
- Browning, Professor Robert  
511-12
- Bruno, Giordano 108
- Budge *see* Wallis Budge
- Burk II, H M 67, 75, 229
- Burk II, I 235
- Burney, Charles 246-7
- Burning Bush 293
- Cabeiroi/Kabeiroi

# THE SIRIUS MYSTERY

- (Samothrace) 294n
- Cadmus 175, 176, 327, 346-7, 348, 349, 361, 363, 365
- Calebites ('Dog-men') 241n, 590-1
- calendars
- computer 69, 262
  - Dogon 105, 111
  - Egyptian 124, 128, 190
  - Greek 262
  - lunar 223
  - Sothic 124, 128, 190
- Calimachus 264, 391
- Calvin, Melvin 84
- Cameron, A G W 84, 115
- Cang Jing 442
- Canis Major *see* Sirius system
- Canopus (city) 163, 240-3, 250, 282, 299-343
- earlier site *see* Bebdet
- Canopus (planet) 242
- Canopus (star) 138
- and geodesics 240, 243, 248, 312
  - name 243
- Capella, Martianus 536, 537, 539
- Capella (star) 229
- carrier-pigeon *see* dove
- Cassini probe 51
- Cassiopeia, Queen of Ethiopia 341-2
- Castalian Spring (of Mars) 349, 352
- cave pictograms CP 4
- Cecrops 421, 422, 423, 425
- cedar 183, 291, 295
- celestial boats
- three goddesses in (Sothis, Anukis and Sais) 135-6, 137, 139, 188, 227, 325, 333, 336-7 *see also* Argo, Arks
- 'cell potential' 44
- cemeteries 218-19, 230, 236, 291
- Centimanus *see* Hecatoncheires
- Cerberus 432
- as Anubis and Herakles 336, 337, 340, 357
  - fifty heads of 196, 227, 237-8, 325, 336, 337, 340
  - parents of *see* Echidnae, Typhon
  - and Scylla 423
  - three heads of 227, 237, 325, 336
- Chaeremon 221
- Chaldeans 534, 548-9, 554-61
- Deluge/Flood 549-56
  - and sixty 267, 574
- Chan Ping-jeung 473
- Chaos Theory 41
- Chatley, Herbert 573-5
- Chavannes, Edouard 443
- Cheops, King of Egypt 26, 29, 30
- Chephren *see* Khephren
- China 303-16
- amphibians 435-41, 442-3,



# INDEX

- 444, 574-5, 643
- blood, circulation of 108
- bow and arrow 137, 139
- metal in tombs 69
- oracle centres 276
- sixty year period 573-5
- sun's shadow measured 305-16, 435
- Christianity 343, 355, 433
  - Christ-Notomno parallels 113, 464-6
- chronos* and *Cronos* 145
- circadian rhythms 127&n
- Circe 389
  - cemetery in Colchis 219, 230, 236, 291
  - and hawk/falcon 220-1, 230, 236, 255
- circumcision 219&n, 236, 330, 499, 564
- civilization *see* high civilization
- Clarke, Arthur C. 12, 16, 64, 65, 69
- Clarke, Robert 66-7
- clocks *see* star clocks
- coins *Pt* 21, 260, 580, 639-40
- colchicum (*crocus*) 228, 238
- Colchis 208-11, 218-19, 225, 231, 236, 273, 362
  - Carce's cemetery in 219, 230, 236-291
  - Egyptians in 209-10, 213, 330
  - Helos' horses stabled at 360
  - language of 210
  - saffron from 228-9, 238
  - see also* Aea; Golden Fleece
- Comma of Pythagoras 35-7
- Complexity Theory 42
- computers, ancient 69, 262, 289
- constellations 126, 129, 229, 381, 594, 642
  - as decans 172
  - see also* Argo (constellation); Orion (constellation); stars
- Contact Period 23
- Cook, A.B. 255, 260, 294
- Cory, I.P. 416-20
- cosmology of Dogons 63-8, 66, 70-1, 7, 300
  - baskets, sacred *Pt* 37, 245, 249, 276, 277
- calendar 105, 111
- correspondences in daily acts of 361, 399
- creation myth 109-10, 112, 13, 479, 489, 490, 492
- Earth's rotation 111
- initiation, stages of 144, 592-3, 594-5, 596
- light and eye 204-5
- monotheism 465
- priests *CP* 8; *Pt* 3-6; 65, 476-98
- Sirius system 94-116, 479-98
  - orbits 114, 224n, 385
  - see also under* Sirius B
  - other stars in solar system

# THE S IR IUS MYSTERY

- 492, 493-6, 497-8  
 Sirius C. 3. 103, 325, 344,  
 404  
*see also* Sigui ceremony;  
 Sirius B *and under*  
 Graule  
 solar system and planets 104,  
 105-6, 111-12, 113, 529  
 souls of dead 44, 401  
 stars 49, 51-2, 107-8, 110,  
 111, *see also* Sirius *and*  
 solar *above*  
*see also* intelligent life  
 Cottians 327-8  
 Cottus (monster) 325, 327-8,  
 356  
 Cotytto (deity) 327-8  
 cow, sacred 349, 350, 363, 365,  
 389  
 Crates of Mallos 522&n  
 creation myths  
   Akkadian *see* *Enuma Elish*  
   in Bible 223, 224  
   Dogon 109-10, 112-13  
 Crete  
   and Delphi 266-7  
   Libyan migration to 336  
   oracle centre *see* Omphalos  
     (Crete)  
   Phaistos Disc 69  
   and Triton 428  
   and willow 293, 295  
   *see also* Knossos; Minoan  
     culture  
 Crocker, Richard L. 251, 253,  
 296  
 crocodile 575-7  
   *hent/henti/hensektz* 388-91,  
   564  
 Crombie, A. C. 517-18  
 Cronos/Saturn (deity) 145,  
   204, 376n, 550, 551, 554  
 cryogenics *see* suspended  
   animation  
 cubit 425-6  
 Curetes 265  
 cybernetics 148n  
   *see also under* *Argo*  
 Cyclopes 255-6  
 Cynopolis 135  
 Cynthus, Mount 259, 299  
 Cyon (Dog Star) *see* Sirius  
 cypress 295  
 Cyprus, oracle centre on 254,  
   261-2, 294-5  
 Cyrus, King of Persia 557-559  
 Cythera *see* Kythera  
 Lyzicus *Pl. 31* 429, 433  
 Dagon, Oannes as 414-15, 416,  
   428, 430, 433, 461  
 'Daemon, Good' 152  
 Damascius 527&n  
 Danae 34.  
 Danaos/Danaus, King of  
   Argos and fifty  
   daughters/sons (Danaiads,  
   196, 327, 346, 358, 643  
   and *Argo* trip to Greece 139,  
   163, 346, 357

# INDEX

- derivation of name 363
- and Sirius system 341-2, 343-4, 385, 403
- and Thesmophoria 345, 365, 401
- dancers, Dogon *CP* 5-7, *Pt* 7
- Däniken, Erich von 15, 69, 75-6
- D'Arcy Thompson, W. 220, 235, 391
- Daremborg, Charles V. 428-31, 472
- 'Dark Mystery'/'Black Rite' of Isis/Osiris 153, 157-159, 165-6, 169-70, 198
- darkness
  - dark companion of Sirius *see* Sirius Band light *see under* duality
  - and Typhon 338-40, 357
  - 'Unknown' 527-8
  - see also* black, 'Dark Mystery' invisibility, under world
- days
  - Day of the Fish *see* arrival *under* Nommos
  - Dog 125-6, 267, 373
  - extra five *see* epagomenal
  - fifteen 173, 214
  - seven 223
  - seventy 190-1, 192, 340
  - ten 172, 190-2, 199
- de Groot, J. J. M. 440-1, 474
- death
  - cemeteries 218-19, 230, 236, 291
  - goddess *see* Hecate
  - mummification 169, 191, 192, 340
  - souls of dead 44, 366-7, 401, *see also* underworld
  - see also* resurrection
- decans 172, *see also* risings *under* stars
- Dechend, Hertha von 139-183, 251, 297, 568, 572
- degenerate matter *see* mass *under* Sirius B
- deities, major *see* An, Anubis, Anunnaki, Apollo, Athena, Gaia, Hecate, Hermes, Horus, Isis, Nephthys, Osannes, Osiris, Serapis, Sorthis, Zeus
- Delos oracle centre 266, 294-5
  - and Apollo 253, 258, 263-4, 292-335
  - Cynthus, Mount 259, 294
  - and Dodona 267-8
  - Hyperborean gifts to 268-71
  - location 259, 299-300
  - omphalos at *Pt* 17, 18, 21, 257, 273, 277, 300, 582-3, 638, 639
  - and palm tree 291, 293, 295, 335, 638
- Delphi oracle centre 225, 294-5, 335
  - and Apollo 253, 254, 256,

# THE SIRIUS MYSTERY

- 266-7, 288  
 Cadmus at 347  
 cavern 39  
 coins from *Pt. 21*  
 and Crete and Minoans 266  
 and Delphinios 428  
 Deukalion's Ark lands near  
     244, 256, 273, 300  
 drugs at 254, 263  
 E at *Pt. 21*, 311, 579-82, 640  
 and Egyptians 339  
 and Gaia 258, 297, 311  
 and Libyan colony 331  
 location 259, 299  
 omphalos at *Pt. 14*, 257, 267,  
     288-9, 300, 638  
 photograph of *Pt. 20*  
 Plutarch at 144  
 power and influence of 211,  
     261  
 priests and priestesses 254,  
     263  
 and Sardis 297  
*see also* Parnassus  
 Delphinios (deity) 428  
 Deluge/Flood 426  
     Chaldean 549-56  
     Chinese 435, 438, 440  
     Egyptian 426  
     Greek 429; *see also*  
         Deukalion  
     Hebrew *see* Noah  
     Nile inundation 133, 190,  
         336  
     Sumerian and Babylonian  
         49, 244, 427  
         *see also* Arks  
 Demarest, Kenneth 562-3  
*dementia temporalis* 127  
 Demeter (deity) 277-322,  
     3458cn, 365  
 Demetrius of Phalerum 534,  
     581  
 Denderah (Egypt) 125  
 dense matter *see* mass  
 Deukalion and Arklands near  
     Delphi 244, 256, 273, 300  
     lands near Dodona 148, 165,  
         180, 200, 244, 281, 300  
     magical ship 180-1  
     and repopulation by stones  
         180, 221, 256, 327  
 Diana (deity) *see* Artemis  
 Didyma (Branchidae) oracle  
     centre 272-3, 294, 638  
 Dieterlen, Germaine *see*  
     Graule  
 Digitaria *see* Sirius B  
*Digitaria exilis* (grass) 66, 67,  
     489, 491  
 Dilmun 170-1  
 Diodorus Siculus 472  
     on *Argo* 177  
     on Avalanta 2.1  
     on Cecrops and Erechtheus  
         423  
     on oracle centres 264, 265,  
         267-8, 296  
 Diogenes Laertius 521, 533  
 Dione (moon of Saturn) 50

- Dis** *see* **Bel**  
 diseases and disorders 228, 238  
**Disocorides** 429  
 divination 75  
**Diado, Oasis of** 329, 334  
**Dierma, Oasis of** 394  
**Dnieper River** 290  
**Dodona, Oracle of** 149, 250-1, 283  
     and Ararat/Metsamor on same latitude 246, 248, 285  
     birds 285, 288, 335  
     and Delos 267-8  
**Druckon's Ark lands near**  
     148, 165, 200, 244, 281, 300  
     location 239, 241, 252, 253, 259, 275  
     origin 301, 581  
     Tomaros, Mount 259, 282, 294-5  
     *see also under oak*  
**dog**  
     Argus 362, 363-364, 401  
     Dog Days 125-6, 267, 373  
     Dog Star (Cygn) *see* **Sirius**  
     of FUKI 440  
     Great Dog constellation *see* **Orion**  
     head from Scylla's waist  
         *Pl* 29, 423, 425  
     -headed deities 203, 218n,  
         *see also* **Anubis**, **Scylla**  
     -men (Calebites) 241n, 590-1  
     **Sphinx** as 17, 423-4, 431  
     and tooth as same word 393-4, 403  
     *see also* **Cerberus**, hounds, jackal, **Orthrus**, pale fox, wolf  
**Dogon people** 18, 79-117  
     and amphibians *see* **Nommos**  
     and circulation of blood 108, 112  
     and circumcision 210&n, 236, 330  
     creation myths 109-10, 112-13  
     daily acts, correspondences n 361, 399  
     location and map 93, 334  
     and Ogo 105, 112-13, 438, 450  
     origins of 23, 32, 321-58, 387, 403, 416, *see also* migration  
     religion and beliefs *see* cosmology  
     villages *GP* 1-3, 5-7  
     *see also* **Gnauke**  
**dolphins** 410, 428, 455, 474-5  
     teeth 459-60  
**Dorians** 336, 345  
**double** *see* **duality**  
**dove, oracular (carrier pigeon)**  
     149, 348  
     black 288, 290, 395  
     and Dodona 285

# THE SIRIUS MYSTERY

- and omphalos *Pl* 33; 276,  
278, 279, 639
- and Phasis 381
- and Siwa 282
- see also* birds *under* Arks
- dragons 440-1
- teeth *see* teeth
- Drar 229-235
- drugs and Delphi oracle 254,  
263
- duality 553
  - darkness and light 135, 282-3, 403, 498, 515, 565
  - deities with fish/serpent tails 421-44; *see also* amphibians; Echidne; Nereus; Typhon
  - double-vault theory of world 436-7
  - fifty and hundred 223-48n, 324-5, 344, 372, 386-8, 487; *see also* Great Year, Sacred Year
  - octave and months 3248n
  - orbits of Jupiter and Mercury 562, 565-6, 568-9, 572-4
  - pair of stars *see* Sirius; Sirius B
  - placentas and Yourougou 497, 503
  - seven and fourteen years 479
  - sixty and hundred and twenty 566
  - water, fresh and sea 451-2
- see also* fifty; Great Year; Isis *under* Osiris
- Duat (Tuat) *see* underworld
- Dudley, D R. 508
- dugongs 460, 461, 462
- Duvent, J L. 4, 47, 56, 82
- dwarf stars
  - brown, incipient, Jupiter as 41
  - G *see* Sun, our
  - red *see* Sirius
  - white 81, 115, *see also* Sirius B
- Dyon 472, 484-495
- E at Delphi *Pl* 27, 311, 579-82, 640
- Ea *see* Enki
- Earth
  - diameter of 58
  - rotation of 111
  - earth-born' (autochthonous) 327, 345, 349-50, 351, 355, 360; *see also* repopulation
- Echidne/Echidna 3368n, 431, *see also* children *under* Typhon
- Echion 'Sown Man' 349, 351
- Edfu (Egypt, 157
- Edwards, I E S. 35, 46, 47, 156
- egg symbolism 480, 495-6, 563
- Egypt and *Argo* 178
  - Cock tuans as Egyptians 209-10, 213, 330

- and crocodiles 576  
 and Delphi 339  
 gods of 121-67  
*see also in particular* Horus,  
 Isis, Osiris, Râ, Sothis  
 Hittites in 586-8  
 language 232, 233, 359-403,  
 426. *see also* hieroglyphs  
 mummification of dead 169,  
 19, 192, 340  
 and oracle centres 241, 248,  
 272-4, 275, 276  
 omphalos stones *Pt 19*  
*see also* Behdet, Canopus  
 (city)  
 origins of civilization 18-19,  
 20, 13  
 pyramids *see* Giza  
 and Sirius 121-67  
 star clocks 128, 172, 173,  
 213-14  
 and Sumer, links with *see*  
*under* Sumerians  
 Zodiac 152  
*see also* Magan, Magan-  
 boats, Njic  
 eight 482-4  
 ancestral Nommos 489  
 Annedott 416-17, 439  
 eighth planet 272  
 gods/chiefs 392-3  
 notes in octave 137, 271-272  
 and eight oracle centres *see*  
 oracle *under* octaves  
 year rule 350-1  
 eighty 501  
 elliptical orbits 96-9, 139-40  
 Emery, W. B. 73, 132n, 157  
*emme ya see* Sorghum-Female  
 Emmons, G. T. 89  
 end of a period 364, 380  
 Endymion, fifty daughters of  
 196  
 Enk/Ea (deity) 49-50, 206,  
 233, 244&rn, 300, 427,  
 445, 452, 454, *see also*  
 Oannes  
 Enkidu (companion of  
 Gilgamesh) 34, 357, 389,  
 393  
 Enlil (deity) 141, 145, 203-4,  
 205&rn, 206  
*Enuma Elish* 171-4, 188-9, 192-  
 3, 195, 233  
 Eos *Pt 11*  
 epagomena, days 128, 130, 172,  
 199  
*Epic of Gilgamesh see*  
 Gilgamesh  
 epicycles 516&rn  
 epsilon *see* E  
 Epsilon Eridani (star) 79, 84  
 Equal Temperament System  
 38  
 equinoxes, precession of 594  
 Eratosthenes 243, 308  
 Erichthonios/Erechtheus 422,  
 423, 425  
 Erida/Erldhu (deity) *see* Enki,  
 Oannes

# THE SIRIUS MYSTERY

- Erigena 536  
*erion* (fleece) 232, 238  
 Eros 324  
 essence, heavy 184, 186-8, 201, 202  
*eta* (star) 241, 244  
 Etana, King of Sumer 191  
 Ethiopia/Ethiopians 210, 280, 333, 394  
 Euclid 353  
 Eudoxus 145, 165, 240, 326  
 Eurapius 342-3, 354  
 Europa (moon of Jupiter) 54  
 Eurytion 340-1, 357  
 Euxine Sea *see* Black Sea  
 extra-terrestrials *see* intelligent life  
 eyes  
     of Anubis 424  
     'eye star', Sirius B as 132, 415  
     hieroglyph 131, 161, 189, 201, 204, 414  
     hundred, monster with *Pt* 27, 364, 365, 371, 401, 643  
     lifted 204-5  
     ring-eyed Cyclopes 255  
 Page, J D 394-5  
 falcon *see* hawk/falcon  
 fermentation 109, 482-3, 500  
 Fibonacci Series and Spiral 33, 57  
 Ficino, Marsilio 150, 151  
 fifteen days 173, 214  
 fifty 168-202  
     Argonauts *see* Argonauts  
     companions *see under*  
         Gigamesh  
     cows stolen 196  
     daughters *see under* Danaos;  
         Nereus, Thetis  
     Dog Days 125-6, 373, 402  
     and forty-nine 217, 384-6  
     gods of light and dark 382-3  
     great gods *see* Anunnaki  
     heads 196, 227, 237-8, 325, 336, 337, 340, 356, 423, 431, 432  
     and Hercules 321  
     hounds of hell *see under*  
         hounds  
     and hundred *see under*  
         duality  
     lunations 324  
     mace heads 181  
     maidens and Bran 324  
     months 223, 227, 236, 324, 384, *see also* Sacred Year  
     names of Marduk 193-4, 233  
     Nereids 196, 327, 342  
     narsmen 140-200, 356, *see also* Argonauts  
     Palantids 335, 357  
     priestesses 324, 327  
     sixty reduced to 50,  
     sons 196, 344, 357, *see also* Danaos  
     years *see* orbit *under* Sirius B



# INDEX

- see also* Minyae, thrones
- Findlay, J N 540, 543
- Fine Structure Constant 37
- First Sothic Cycle 18-19
- fish
- 'Day of' *see* arrival under  
        Noturus
- deity *see* Oannes
- land of 112, *see also* Sirius
- tuns *see* deities under duality
- Fitzgerald, R. 18, 302
- five days 500
- epagomenal 128, 130, 172,  
        190
- Flood *see* Deluge
- fonta *see* *Digitaria exilis*
- Forrer, E. 585-6
- forty-nine 237, 384-7, 487
- four 324-490
- fourteen years 479
- fox *see* pale fox
- freemasonry 596-607
- Freitag, Robert 12-14
- French explorers and  
    Amerindians 88-9
- Fuxi (Fu-Hsi, amphibian) 436-  
    41, 442-3; *see also* Oannes
- Gai Tan (Kai T'ien) 436-7
- Gaea (deity)
- bones thrown by Deukalion  
        to repeople Earth 180  
        221, 256, 327, 350
- children of 2.2 256, 325-9,  
        338, 341, 356, 422, 423,  
        425
- and Delphi 258, 297, 311
- dog of 271
- Gables Galles and Galilean  
    moons 105, 106
- Galpin, F W 296
- Garamantians/Garamantes/  
    Gomphasantes 329-33,  
        334, 356-7, 394-8, 403,  
        577, *see also* migration
- Garamas 329, 338, 356
- Garstang, John 297, 298, 328n
- Geller, Uri 12
- geodetics 239-320
- centre *see* Thebes (Egypt)
- see also* altitude and  
        longitude, omphalos,  
        oracle centres, oracle  
        under octaves, projection
- Georgia 208, 247
- Gerizim, Mount 277
- Geryon 341
- Ghana. Akan people 331-2,  
    334, 353-4
- Gilgamesh (and *Epic of*  
    *Gilgamesh*) 7
- amphibious 427
- and Argonauts 174, 199
- and bird 285
- cedar felled 183, 291
- dream of Anu's heavy star  
        essence 184, 186-8, 201
- and Enkidu 341
- fifty companions 136, 174,  
        212, 237-8, 344; *see also*

# THE SIRILS MYSTERY

- Enkidu  
 and Hercules 250  
 and Jason 174, 355  
 and Magan-boat 178-80,  
 181, 182, 200, 283-4  
 and Noah 180  
 and teeth 175, 180-1, 199,  
 327-352, 598  
 Giza Plateau and Pyramids of  
 Egypt 5, 16-35, 57, 115  
 measurements 19, 33, 7, 46,  
 207  
 and water 18, 21-2, 23, 32  
*see also* Great Pyramid  
 Sphinx  
 Glaucos/Glaucus 140, 249,  
 426, 430  
 gnomons 308-16  
 Gnostic sects 433  
 gods and goddesses *see* deities  
 Golden Fleece 172, 175, 209,  
 235-6  
 and Aries 229  
 colour of 228, 230, 238  
 and Horus 230-4  
 and Jason *see* *Argo*  
 location of *see* Colchus  
 meaning of word 232, 238  
 origin of 177, 200, 222  
 from Phrixos 208  
 portrayed *Pl.* 22, 640  
 Golden Section and 'Golden  
 Spiral' 33, 57  
 Gong Gong (Kang-Kang) 437,  
 438  
 Goodson, David 459  
 Gordon, Cyrus 181, 200, 257  
 8, 261, 262  
 Gordon, Seton 26, 390  
 Gou Shou Jing 3.2  
 gout, saffron as remedy for  
 228, 238  
 Graces 222, 342  
 Graves, Robertson Abraham  
 and Adam 589-91  
 on Actaeon (Axtaion) 223,  
 228  
 on Akan people 331-2  
 on Anubis 357  
 on Apollo 255  
 on Athene 335  
 on Briareus 329  
 on Cadmus 347, 349, 350-1  
 on Cerberus 336, 357  
 on Colchus 218&n  
 on Cottus 356  
 on Crete 336  
 on Cyclops/Cyclopes 255-6  
 on Danae 341, 344  
 on E at Delphi 581  
 on Eurytion and Enkidu  
 341, 357  
 on fifty months/lunations  
 237, 324  
 on Garamantians 329-32,  
 395-398  
 on Hebron 241n, 293, 589-  
 91  
 on Hecate 23, 357  
 on Hercules 212, 232, 329

# INDEX

- on Jason 212, 235, 346-7, 349
- on Nereids 342
- on oracle centres 255
- on Pelasgians 350
- on Sacred Year 384, 386, 387
- on Theopius/Thestios 322-7
- on trees 291, 293, 298-9
- gravity of Sirius B 81
- Great Circle 372-3
- Great Dog *see* Sirius system
- Great Flood *see* Deluge
- Great Goddess *see* Gaia
- Great Gods *see* An/Anu, Arunnaku
- Great Labyrinth 28
- Great Pyramid 392
  - Aakhu-t* as name for 424
  - measurement 33-7 207
  - representing Sirius B 35
- Great Year 223, 237-324, 349, 364, 372
  - ha f of *see* Sacred Year
- Greece
  - amphibians *Pt.* 29-421-32
  - Arcadia 345
  - calendars 262
  - Deluge *see* Deukalion and fifty 140
  - language 137-220, 230, 231-2, 255, 326, 338, 359, 363, 365-6, 401
  - Lemnos 331-332, 403
  - major authors *see* Aristotle,
- Diodorus Siculus;
- Herodorus, Hesiod;
- Homer, Pausanias,
- Pindar; Plato, Plutarch,
- Proclus
- major deities
  - amphibian *Pt.* 29; 421-32
  - see also* Nereus, Typhon
  - see also* Apollo; Athena;
  - Gaia, Hecate, Hekdos,
  - Hermes, Poseidon, Zeus
- Mycenae 215-17, 261, 297
- Zodiac 152
  - see also* Argonauts, Minotaur;
  - oracle centres, Proclus
- Graute, Marcel and Dieterlen,
- G on Dogon 145, 399
- Griauc's funeral 70
- Renard pâle* 68, 103-16, 399, 569
- Sirigi masks 452
- and Sirius system 63-5, 91, 116, 445-52, 474, 476-503
- see also* Dogon
- Gudea, ruler of Sumerians 181
- Gurney Oliver R 296, 367n, 584-8
- Gyges (monster) 325, 326-7, 356
- Hades *see* hell under bounds: underworld
- hare (Lepus) 129, 348, 642
- harmony *see* under music
- Harpies 431

- Harrell, James M. 31, 56  
 Harris, Rendel 268  
 Harrison, E. R. 41, 59  
 Harvey, William 108-9, 281  
 Hathor (sacred cow) 350, 365, 389  
 Hawara, Pyramid of 29  
 hawk/falcon 218, 220-1, 230, 236, 255, 390  
 heads  
   hundred 430, 432  
   two 336, 371  
   *see also under* black; dog, fifty three  
 heaviness *see* mass/weight  
 Hebrews (Jews)  
   and Gerizim, Mount 277  
   language 373  
   Moses 293, 402-3, 585  
   myth *see* Noah  
   origin of 91, 589  
   *see also* Bible, Josephus  
 Hebron (Palestine) 294  
   Hittites at 584-91  
   oracle centre at 241n, 259, 293, 588-9  
 Hecate/Hekate (deity) 218n  
   equated with Anubis and Cerberus 336, 357  
   and hundred 224&n, 237, 357, 387, 394, 401  
   and Proclus 510, 513, 535  
   and Scylla 423  
   as Sothis 218  
   three heads of 218n, 227, 325, 336  
   *see also* Isis  
 Hecatoncheires (Cottus, Briareus and Gyges) 212, 325-9, 356  
 Heidel, Alexander 141, 182, 186, 196, 233  
 Hekate (deity) *see* Hecate  
 heliacal rising of Sirius *Pl. II*, 25, 19, 124, 125, 130, 139, 190, 247-361  
 Helopolis (earlier An) 92, 376  
 Helios (deity) 219, 230, 231-2, 238, 360  
 hell *see under* underworld and under hounds  
 Helie 177, 208, 222, 230, 429  
 Heliospont 208  
 helu 230  
 Hernaka 131&n  
 Henb-Requ (deity) 392  
 Henu-Neferit 389  
 Henrard, J. Th. 67-75  
*hent/henti/hensekti* 388-91, 564  
 Hep 232  
 Hephaestus (deity) 155, 434  
 Hera (deity) 232, 342, 363, 643  
 Heraclides of Pontus 519, 538, 544  
 Hercules/Heraclēs  
   and *Argo* and Jason 211-212, 232, 250, 326, 329, 355  
   as Briareus 212, 329  
   Canopic 250, 273, 339  
   and Cerberus 227

# INDEX

- and fifty daughters of  
     Thesmos 321, 323
- and Geryon 34
- and Gilgamesh 250
- and Hylas 209
- teeth 598
- Hermes/Mercury (deity)
  - Anubis as 177, 200
  - on books 158
  - as extraterrestrial 154
  - fifty cows stolen by 196
  - hermetic literature *see*  
     Trismegistic
  - son *see* Horus
  - as teacher 169
  - see also* Mercury (planet)
- hero 230-1
- Herodotus
  - on Athene 333
  - on birds 221, 279, 282, 288,  
     395
  - on circumcision 236
  - on Colchis 178, 209-10, 212-  
     13, 219, 330
  - on crocodile 577
  - on Delos 268-9
  - on Dodona 149, 300, 581
  - on Garamantians *see* Libya  
     *below*
  - on Giza Plateau and Lake  
     Moeris 25-30, 56, 576
  - on Jason 331
  - on Kythera 258, 261-2
  - on Libya and Garamantians  
     331, 333, 394-5, 397, 403,  
     577
  - on Pelasgians 332
  - on sea power 215
  - on Thesmophoria 345
  - on Tyre 321
- Heroic Age 217
- Hieru/Hieru-sa-Agga 182, 230-  
     4, 350; *see also* Horus
- Hesiodon amphibians 421, 423,  
     428, 472
  - on Cerberus 238
  - on Echidne and Typhon  
     431-2
  - grave of 222
  - on Hecate 218n
  - on Nereids 358
  - on strength 327
- Hesychius 256&n
- Hierapolis (Bambyce) 259, 284,  
     294, 297
- hierax see* hawk
- hieroglyphs
  - l and r the same 230
  - ark 364
  - Armenian 246
  - eye (and throne) 131, 161,  
     189, 201, 204, 414
  - hawk 22
  - 'Hyman to Osiris' 374
  - latitude and longitude 291
  - oarsmen 328
  - r 16-17
  - serpent and goddess 359
  - thorn 357
  - tooth *see under* teeth

# THE SIRILS MYSTERY

- triangle 402
- two circuits 372
- see also under* thrones
- Higgins, Godfrey 256, 296
- high civilization kick started
  - 32, 73
  - 'take-off' point 86
  - see also* amphibians
- hul (*hursag/hursagga*), deities
  - of 179-80, 181-3, 201,
  - 206, 376, 379
- Hinduism 139, 243, 257, 368-9, 426-7
- Hippolyte 326
- Histories see* Herodotus
- Hittites 369-70, 584-91
- 'Ho Diagram 435
- Hogons 482-4, 487-8, 495, 500
- Homer 522, *see also Hymn to Apollo Odyssey*
- Hoo Shee 137
- Hopkins, L.C. 439-40, 473
- horses of Sun 326, 360
- Horus (deity)
  - and Apollo 255
  - birth of 371
  - bones of 147, 148
  - and cemeteries 218-19, 236
  - Child 255
  - forms of name 233-4
  - and Golden Fleece 230-4, 238
  - and hawk/falcon 218, 221, 230
  - and Isis 153, 176, 182, 184,
  - 432-3
  - lodestone as bone of 147-8, 378
  - and Osiris 182, 370
  - and Pepi 376
  - as star 376
  - and Sun, our 146, 164, 219
  - see also* Heru
- Horus, Elder (Anubis) 433, 473
- hounds
  - cosmic *see* Orthrus
  - of hell 223, 226, 227, 236,
  - see also* Cerberus
  - see also* dog
- Humbaba (Huwawa) 183, 185
- Hume, David 281, 298
- hundred 224
  - arms/hands, monsters with 325
  - eyes *see under* eyes
  - and fifty *see under* duality
  - heads 430, 432
  - and Hecate *see under* Hecate
  - months 223, 224n, 350-1, 394, 403, *see also* Great Year
  - and twenty years 389, 566
- Hurry, Jamieson B. 155-7
- hursag/hursagga see* hul
- Huwawa (Humbaba) 182, 185
- Hydra of Lerna 196, 432
- Hyginus 349
- Hylas 209
- Hymn to Apollo, Homeric* 263,

# INDEX

- 266-7, 300  
 'Hymn to Osiris' 374  
 Hyperborean gifts 267-71  
 Ia *see* Enki  
 Iamblichus of Chalcis 150,  
     542-3  
 Ibi 482, 484  
 Ideler, Christian L. 137-8, 243  
*ie petu tola see* tenth moon  
 Ieue (deity) *see* Jehovah  
 Igigi 190, 191, *see also*  
     Anunnaki  
 I-Hsing *see* Y xing  
 Imhotep 20, 154, 155  
 India 420, 567  
     Indus River and Valley 170,  
     242n  
     *see also* Aryans, Hinduism,  
     Sanskrit  
 Infantino, Stephen C. 104n  
 initiation, Dogon *see under*  
     cosmology  
 Innehouzou *Pt* 5, 477  
 Inner Limb of Sun 58-9  
 Instructors, Nommo 479-80,  
     497  
 intelligent life, extraterrestrial  
     83-9  
     and Dogons *Pt* 9, 110  
     nature of 469-70  
     visits from 154, 398, 405,  
     468-9; *see also*  
     amphibians, Nommos:  
     suspended animation  
     *see also* signals  
 Internet 5  
 intestines, Mercury's orbit  
     compared with 185, 272  
 inundation *see* Deluge  
 invisibility  
     orbits 525-30; *see also*  
     darkness and under  
     Sirius B  
 Io (deity) 363, 365, 401, 643  
 Iolchus 249  
 iron as bones 147-8, 378  
*ishu* 139  
 Isi (Hindu deity) 139  
 Isis (deity)  
     and *Argo* 139, 147, 163  
     and ark 139  
     as *Äst* 130-3  
     and Athena 147, 148, 165  
     and 'Black Rite' *see* 'Dark  
     Mystery'  
     as Demeter 365  
     Denderah temple 125  
     depicted *Pt* 31, 2441, 643  
     and fifty 401  
     and Hathor 350  
     and Horus 153, 176, 182,  
     184, 432-3  
     of light *see* Sothis  
     and Nephthys 195  
     and Osiris *see under* Osiris  
     priests of 153  
     and Sirius 153, 161, 166,  
     221, 365, 392  
     and throne 358, 392

# THE SIRIUS MYSTERY

- Isvara (Hindu deity) 139  
 I Xing *see* Yixing
- jackal gods 141, 164, 392, *see*  
*also* dog, dog *under*  
 Anubis
- Jacobsen, Thorkild 203, 283
- Jason *see* Argo
- Jehovah (Yahweh/Jeue) 257,  
 293, 581-2
- Jerusalem 277, 589
- Johannes Scotus Erigena  
 (John the Scot) 536
- Josephus 206, 207 556-9
- Jowett, Benjamin 516, 539
- Ju an the Apostate 542, 561-2
- Jupiter (deity) *see* Zeus
- Jupiter (planet)  
 as incipient brown dwarf  
 star 41  
 moons of 54, 105, 106  
 and Omphalos (Crete) 295  
 orbit 105  
*see also under* duality  
 origin 112  
 as Vrihaspati 567
- Kabeiroi/Cabeiroi  
 (Samothrace) 294*n*
- Kai T'ien (Gai Tian, 436-7  
*kanaga* 500
- Kasion, Mount (Egypt) 260,  
 294
- Kasion, Mount (Latakia) 260,  
 432
- Kasios 260, 294
- Katutome Kanonos 23-4
- Kepler Johannes 96, 142, 386,  
 522-4, 541 568
- khammen/khemut 22, 373
- al-Khazwini 137-8
- khem/khemut 374
- Khephren, King of Egypt and  
 Pyramid 26, 30, 35, 46
- Ki (deity) 206, *see also*  
 Ninhursag
- kick-start *see* high civilization
- Kilmer, Anne D. 251, 253, 296
- Kirke *see* Circe
- kirkens 221
- ku-sir/kesru 186
- Klinowska, Margaret 459
- Knight, Christopher 596, 601,  
 604
- Knossos 267, 273, 428  
 oracle near *see* Omphalos  
 (Crete)
- Kolaxais 33.
- Komakon (village) CP 2, 5-7;
- Konenze 330
- Koromantse 330
- Kouyunjik (Iraq) Pl 34, 245
- Kramer, Samuel N. 60, 141,  
 234*n*  
 on Dilmun and Magan 171  
 on Gilgamesh 174, 177, 179,  
 183, 186-8  
 on oracles 283, 285, 298  
 on ploughing 640-1, 642  
 on Sirius 643



# INDEX

- on symbolic weapons 182
- Kronos (deity) *see* Cronos
- Kung-Kung (Gong-Gong)
  - 437, 438
- Kythera (Cythera) oracle
  - centre 253, 257-8, 259,
  - 261, 300
- Lin Egyptian 194-5, 230, 390
- La Pérouse, J. F. de Galaup 89
- Lang, David 246-7
- language
  - Akan 354
  - Akkadian 90
  - Arabic 137, 373
  - Chinese 439
  - Cochian 2.0
  - Egyptian *see under* Egypt
  - Greek *see under* Greece
  - Hebrew 371
  - Hittite 369-70
  - Latin 137
  - Libya 333
  - Semitic 90
  - Sumerian 90, 140, 141
  - written, lack of 89-90
  - see also* hieroglyphs; Sanskrit
- Laphystion, Mount 222, 227
- lapis lazuli 204, 205
- laryngeal sound 369
- Latakia 259; *see also* Kasion
- Latin language 137
- latitude and longitude 266
  - and Chinese 306-16, 435
  - hieroglyphs for 291
- map of 259
- on omphalos stones 280, 292
- prime meridian through
  - Behdet 242, 266, 273-4,
  - 275, 278, 282
- of Rhodes 317
- seven degrees 257
- see also* geodesics
- Latmos, Mount 294
- laurel 291, 295, 639
- Lebanon and Mount Lebanon
  - 259, 291, 294, 322
- Lee, Carmen 304
- legends *see* myths and legends
- legs joined 165, 420, 571
- Lemnos 331, 403
- Leonard, John (and family)
  - 597-8
- Lepus (hare) 129, 348, 642
- Lessing, Doris 7-8, 56
- Levi, Peter 222, 321
- Levita, Elias 590
- Libya 288, 333; *see also*
  - Garamantians, migration,
  - Mynyas, Siwa, Triton.
- Lake
- Liddell and Scott: on Greek
  - 137, 220, 231, 326, 338,
  - 363, 365
- light
  - and darkness *see under*
  - duality
  - and eye 204-5
  - Isis of *see* Sothis
  - lack of *see* darkness

# THE SIRIUS MYSTERY

- lifted 204-5
- ray of 139
- Landenbad, Irving 65, 80, 82,  
98, 104, 636-7
- Little Bear (constellation) 126
- Lau Chuo 309
- Lloyd, A. C. 508-11, 512
- Lockyer, Sir Norman 243, 251,  
296, 297
- odestone as bone of Horus  
147-8, 378
- Lomas, Robert 596, 601, 604
- longitude *see* latitude and  
longitude
- Lopez, Jose Alvarez 57
- Lu Gwei-Djen 303-7 310-12,  
314-15
- Lugubanda (deity) 176
- lunar/ unations *see* our Moon  
*under* moons
- Lyceum (Athens) 346
- Lydia 215. *see also* Sardis
- Lykaon, fifty sons of 196
- MacGowan, Roger 469-70
- Macrobius 38, 40, 58, 526,  
536-7, 539, 543
- Magan, Egypt as 140-1, 163,  
171
- Magan-boats 212, 362  
*see also under* Glgamesh
- magical ships *see* Arks, celestial  
boats
- Magurru-boats *see* Magan-  
boats
- Malatia (Malatya) 297
- Mali *see* Dogon
- al-Ma'mun, Caliph 308
- Manda D' Orosongo Pl 3, 477,  
479
- Manetho 147, 152, 378
- Marduk (deity) 194-5, 204  
fifty names of 193-4, 233  
*see also* *Enuma Elish*
- Marius 317, 319, 541
- E. Marj (Barce/Barca), oracle  
centre at 254, 259, 294
- Mars (planet) 54, 71 2, 112,  
295
- Mars/Ares (deity) 272, 349  
Castalian Spring 349, 352
- Mashu 642-3
- masks 450, 452, 480-2, 500
- mass/weight and strength 402  
and Ark 363  
heavy 100, 229, 375  
Anu's star essence 184,  
186-8, 201, 202  
Canopus 138, 163, 248  
and monsters 327, 329,  
356  
*see also* *Wazn annu under*  
Sirius B
- Sirius A 47
- Sirius B *see under* Sirius B
- Sun, our 39-43 47, 59  
of Tchenertu 371  
*see also* *tchens*
- Mayans 172
- Mead, G. R.S. 150-1, 152-3,

# INDEX

- 562
- measurement
- metric system 307
- Pyramids of Egypt 19, 33-7,  
46, 207
- of sun's shadow 308-16  
*see also* geodetics, latitude  
and longitude; numbers
- Mecca 273
- Medea *Pf* 22, 218, 227, 229,  
230
- Vedic family 150, 151
- Megamede 323
- Megasthenes 420, 560-1
- meh/ mehat* 425-6
- Memphis 218, 236, 274
- mem* 374
- Mercury (deity) *see* Hermes
- Mercury (planet) 58, 183, 295  
orbit 185, 272, 539, 540  
*see also* under duality
- mermaids 136, 409-13, 421
- Mesopotamia *see* Sumerians
- metal 69, 247  
heavy star 100, 375, 378-9,  
402, 490-2  
silver 367-9
- Metsamor 246-7, 251, 273,  
281, 294  
location 252, 259, 275, 300  
photograph of *Pf* 13  
*see also* Ararat
- Mexico 22, 191
- Meyrowitz, Eva 331, 353-4  
398
- migration of Garamantians to  
Dogon territory from  
Libya 330, 332-3, 334,  
337, 356-7, 387, 397-8
- Vilerus 259, 294, 638
- Milky Way (*yaku ulu*) 107, 109,  
112, 498
- Mimanka people 476
- Minoan culture 260, 261, 267,  
300, 336  
end of 214-17  
*see also* Crete
- Minvae and Minvas 177-8,  
208, 209, 210, 216, 221,  
273, 347  
and stones 222-3  
*see also* Garamantians
- Mithras (deity) 382
- Moers, Lake 27-8, 576
- Monier Williams, Sir Monier  
139, 427, 472
- months 172, 199, 324&n, 565-6  
*see also* years and under fifty  
and hundred
- moons  
of other planets 50, 54, 105,  
106, 526-31, 545-6  
Phoebe 49, 51, 2, 449  
our Moon 295, 514, 522,  
565-6  
fifty lunations and  
priestesses 324  
lunar calendar 223
- Moses 293, 402-3, 585
- mountains

# THE SIRIUS MYSTERY

- beacon-signalling system  
279-81
- major *see* Ararat, Parnassus
- Moussou Korom Koudye 499
- mummification of dead 169  
191, 192, 340
- Murdm, Paul 636-7
- Mulsarus Oannes 416, 549
- Muses, Charles 75
- music 322, 324n, 471
  - harmonic theory and  
resonance 38-46, 58, 572
  - 'harmony of spheres' 271
  - oldest revival of 251, 253
  - silent 572-3
  - see also* octaves
- Mycenae 215-17, 261, 297
- Mycerinus, pyramid of 47
- mystery religions 423
  - of Hecate 511-513, 535
  - of Isis and Osiris *see* 'Dark  
Mystery'; Thesmophoria
  - Orphic 513
  - see also* Anubis
- myths and legends 63
  - French travellers become  
88-9
  - see also* amphibians; creation.  
Deluge
- Nabonassar, King of Chaldeans  
556
- Nabopolassar, King of  
Chaldeans 556-7
- Nabuchodonosor *see*
- Nebuchadnezzar  
*namshub/namru* 195
- Nangong Yueh 312-13
- nave. *see* omphalos
- Nazca Lines (Peru) 22-3
- Neb/Neb-Heru 233-4, 350
- Nebiru 233
- Nebuchadnezzar, King of  
Chaldeans 557-8, 560-1
- Needham, Joseph 303-7, 309,  
310-12, 314-15, 435-7,  
441, 473, 474
- Nefertiti 277
- Nerth (deity) 195, 333, *see also*  
Isis
- Nemaea 342, 343n
- Neoplatonists *see* Plato
- Nephthys (deity) as Aar-ti 393  
and Anubis 135, 147, 162,  
164, 424  
and darkness 143  
and Pepi 376-7  
and Sirius C 377-8  
and Sirius B 134-5, 198, 350,  
366, 376, 391  
and souls of dead 366, 401
- Neptune (planet): orbit 51,  
170, 198, 272
- Nereus and fifty daughters  
(Nereids) *Pf* 28; 196, 327,  
342-357-8, 421, 426, 429
- Nesi-Amun, Papyrus of 195
- Neugebauer, Otto 128, 135-6,  
137, 171, 188, 190
- New Guinea Sumerian

# INDEX

- mathematics 69
- Niger River area *see* Dagon
- night *see* darkness
- 'Night' (celestial object) 170,  
198, *see also* dark  
Mystery'
- Nile River 242
  - Dnieper River as  
counterpart 290
  - inundation of 133, 190, 336
- nine 482
- Ninhursag/Ki/Ninmah/  
Nintu (deity) 179, 181-2,  
206, 393
- Ninsun (deity) 176, 184, 187
- Nintu *see* Ninhursag
- Ninurta (deity) 186, 203
- Nippur (Sumer) 2048n
- Noah and Ark 139
  - Ararat landing 208, 239  
244-6, 281, 299
  - and birds 291
  - Greek version *see* Deukalion
  - magical ship 180-1
  - proto-Noah 244, 248
  - and Sumerians 91
  - as Ziusadra 454
- Nommos (amphibians)
  - appearance *Pf* 10, 111, 439,  
444-6, 455, 571
  - see also* repulsive
  - arrival in Ark ('day of the  
fish') 52, 112, 445-6, 446-  
52
  - Babylonian equivalent of 244
  - Christ parallels 113, 464-6
  - classified 444, 446, 449-50,  
*see also* Ogo
  - and crocodiles 575-7
  - and dolphins 460
  - eight ancestors, 489
  - Instructors 479-80, 497
  - life on Sirius 452-9, 469-70
  - 'mouth of' 415
  - placenta of 111
  - resurrection 113, 449, 450,  
451
  - return predicted 52, 113
  - suspended animation 48,  
52, 405, 446
  - teeth 456, 462
  - see also* amphibians
- northern octave theory 262-73,  
277-288
- Nu (deity) 141
- Nu Gua/Nu Wa/Nü Kua 434-  
5, 437, 440-1, 442-575
- Nubia 276
- numbers, significant
  - eighty 501
  - forty-nine 237, 384-7, 487
  - four 324, 490
  - fourteen 479
  - hundred and twenty 389,  
566
  - nine 482
  - sacred fraction ( $\frac{256}{24}$ ) 38
  - ten *see* ten, tenth
  - twenty 482, 483
  - twenty four 383, 484

# THE SIRIUS MYSTERY

- twenty-two 464  
*see also* eight, fifty, hundred,  
 measurement, seven,  
 seventy, sixty three;  
 twelve: two
- oak  
 of Dodona 148, 149, 213,  
 248, 257, 288, 291, 295,  
 395  
*see also* cybernetic under  
*Argo*  
 and Garamantians 329, 395
- Oannes (deity) 165, 276, 300  
 and Argo (constellation) 244  
 Berossus/Polyhistor on 552  
 and omphalos 276, 277  
 portrayed *CP* 8, *Pl.* 34 9;  
 245, 249, 414-15  
 sacred basket of *Pl.* 37, 245,  
 249, 276, 277  
 as Tyrrhenus *Pl.* 30  
 Zeus as 165, 420, 571  
*see also* Dagon, FLX1
- oarsmen and oars 337  
 time between strokes 329,  
 356  
*see also* under fifty
- oceans  
 Nommos' future rule from  
 52 3  
 'People of the Sea' 591  
*see also* amphibians, Old  
 Men of Sea
- octaves  
 eight notes 137, 271, 272  
 oracle (geodetic) 300, 317  
 335, 581  
 chart of  
 atitudinal bands. map of  
 259  
 sequence 253-4, 257 259  
 sites *see* oracle centres  
*see also* northern octave  
 seven notes *see* under seven
- Odacon 415, *see also* Dagon  
*Odyssey* (Homer) 217  
*Argo* mentioned in 148, 212,  
 213  
 Argus the dog 362, 363, 364,  
 401  
 bird of Apollo 220  
 Carce episode 219  
 and Helios 231  
 hero used in 231  
 Odysseus (Ulysses) 362, 363,  
 364  
 Scylla in 423  
 sirens in 136-7  
 and Typhon 430
- Oedipus 432-3  
 Ogo (fallen deity) 105, 112-13,  
 438, 450
- Old Men of Sea  
 Proteus and Glaucus 140,  
 421, 426, 429-30  
*see also* Nereus, Poseidon
- Olympic Games 237, 324 384  
 Olympiodorus 5658n  
*om/omph* 257, 322  
 Omphalos (Crete) 253, 257,

# INDEX

- 259, 265, 273, 294-5
- omphalos (navel) and omphalos  
stones 273, 274, 288-9,  
290, 300, 415, 591, 638-9
- Babylonian *Pl.* 17
- and birds *Pl.* 33, 276, 278,  
279-639
- on coins *Pl.* 21, 639
- Egyptian *Pl.* 19
- at Mount Kasos 260
- latitude and longitude on  
280, 292, 638
- at Milerus *Pl.* 16, 277
- and Oannes 276, 277
- and *om* 257-322
- and serpent 267, 280
- see also under* Delos, De phi
- Omphos. Osiris as 381
- Onga (deity) *see under* Athena
- Ongnonlou. Dolo *Pl.* 4-477, 483
- oracle centres 240-320
- major *see* Delos, Delphi,  
Dodona, Hebron,  
Hierapo is, Kythera,  
Marj. Omphalos (Crete);  
Triton, Lake
- priests/priestesses *see under*  
priests
- see also* oracle *under* octaves
- oral tradition 89-90
- orbits
- elliptical 96-9, 139-40
- invisible 525-30
- planets of our system 170,  
185, 198, 272, 539, 572
- see also under* duality,  
Jupiter, Saturn
- Proclus on 516-19, 525-30,  
544
- stars 114, 147, 224n
- see also under* Sirius B
- see also* Great Year
- Orchomenos/Orchomenus  
177-208, 222, 227; *see also*  
Minyas and Minyae
- Ordway, Frederick 469-70
- Orion (constellation) 129
- Cadmus as 348
- fifty sons of 196
- and Giza pyramids 34
- and hare 348
- Orion's Belt 34, 139, 440
- and Osiris 131, 161-2, 197,  
201-221
- and rising of Sirius 130
- and Sirius B 197
- Orion (deity) *Pl.* 11, 196, 221
- Ormazdes (Ahura Mazda) 283,  
382-3
- Orpheus/Orphic mysteries  
211, 513
- Orthrus/Orthros (dog) 336,  
337-340-1, 357-431-2
- Osiris (deity)
- as An 142
- as Anubis 135, 145-6, 162-3
- and Apis the bull 143
- and Argo (constellation) 248,  
377-8
- and Ark 139

# THE SIRIUS MYSTERY

- as As-Ar 131-2, 194, 232
- black *see* 'Dark Mystery'
- cult at Abydos 132
- as 'dark god' 154-5
- female counterpart *see*  
Sothis
- hieroglyph of throne over  
eye 131 161, 189, 201
- and Horus 182-370
- 'Hymn to Osiris' 374
- and Isis 153, 158, 166, 168,  
189, 198, 202, 433-4, 441,  
461
- see also under* Plutarch
- as Omphir 381
- and Orion 131, 161, 197,  
201-221
- as Reason 145-6
- secrets of 158
- as Sirius B 161-2, 378
- and sixty year cycle 564
- sons of *see* Anubis; Horus
- and 'Virgin of World' 168-9
- and wind 146
- see also* 'Dark Mystery';  
Serapis
- 'Other World' 44, 171, 367; *see*  
*also* underworld
- otter, sea 462-3
- Oxyrhynchus 135
- Ozma, Project 79-80
  
- Palatopolis 258
- pale fox *Pl 2* 103 16, 497, 592-  
5
- crushed 113
- Ogo as 105, 112-13, 438, 450  
*see also under* Graule
- Palastine *see* Hebron
- Palantrids, fifty 335, 357
- Pallas Athene *see* Athena
- palma tree and Deios 291, 292,  
295, 335, 638, 639
- Parke H.W. 148 211, 244,  
262-8, 272-3, 296
- Parker Richard 128, 190, 258
- Parnassus, Mount 259, 294  
Deukalion lands on 244,  
256, 273, 300
- Particle of Pythagoras 37
- Pausanias 221, 227, 250, 269,  
297, 321, 346
- pédalion see* Canopus (star)
- Peasians 331, 332, 345, 350
- Peorus (Sown Man) and  
Peloria 349, 355
- Pepi I, King of Egypt 376-7
- Perseus 341
- Persia 90, 154, 382-383n, 557-9
- Peru Nazca Lines 22-3
- Petrie, Flinders 395
- Phaistos disc (Crete) 69
- Pharus 395
- Phasis River (*earlier* Arcturus)  
219, 380-1
- phagus *see* oak
- Philip of Opus 532, 540
- Philistines 414, 591, *see also*  
Dagon
- Phulolais of Croton 533-4, 538



- Phoebe** (moon of Saturn) 49,  
51 2, 449
- Phoenicians** 210, 258, 262
- Phoroneus** *see* Bran
- Photius** 562-3
- Phrixos/Phrixus** 177, 208, 222,  
230, 272, 429
- pictograms *CP* 4, 246
- Pindar** 212, 231, 271, 343, 346,  
358, 430
- placenta, star systems as 11.  
12. 113, 497, 503, 571
- planets  
  numbers of 53, 271  
  origins of 112
- Proclus/Neoplatonists** on  
  504-47
- of Sirius 96-9, 102, 114,  
  224n. 386
- see also* Jupiter, Mars,  
  Mercury, moons,  
  Neptune: orbits, Pluto;  
  Saturn: solar system,  
  Uranus, Venus
- plants *see* colchicum, trees
- Plato and Neoplatonists** 58,  
  137, 145, 150, 235, 333  
  on solar system 504-47, 565-  
  6  
  *see also* Proclus, Trismegistic  
  literature
- ploughing 389, 391 640-1, 642
- Plutarchon** Anubis *see under*  
  Anubis: Athena and Isis  
  148
- on crocodile 576  
  on E at Delphi 579-82  
  on Horus 146, 221, 434-473  
  on Nule 190  
  on Osiris and Isis 144, 146-  
  7 148, 152 366n, 378,  
  381-2 401, 424-472  
  as priest 144, 145, 164  
  on rivers and mountains 380  
  on Sirius 402  
  on solar system 520-1  
  on Typhon 430  
  on Zeus 420, 571
- Pluto** (planet): orbit 51, 170,  
  198, 272, 572
- pō* *see* Sirius B
- Pole Star** 107 126, 308
- Polyhistor, Alexander** 907n,  
  417-19, 420, 549, 551-6
- Polyphemus** 255
- Ponderosus** *see* Wazn
- Porphyrus** 58, 221, 235
- Posidon** (deity) 343 347 421,  
  422, 423  
  son *see* Triton
- precession of equinoxes 594
- Priam, King, fifty sons of** 196
- Price, Derek** 69, 262
- priests and priestesses  
  of Dark Mystery 154  
  Dogon *CP* 8; *PI* 7-6, 65,  
  476-98  
  fifty 324, 327, 335  
  of Isis 153  
  oracular 258, 292

# THE S R I U S M Y S T E R Y

- Delphi 254, 263  
 Dodona 149, 288  
 Plutarch as 144, 145, 164  
 of Poseidon's temple 347  
 and vowels 581-2  
 Prigogine, Ilya 42-59  
 prime meridian *see under*  
     latitude  
 Pritchard, J B 116, 234  
 Proclus *Pt* 40-1, 5, 38-9, 326,  
     353, 504-47, 643  
 Procris 323  
 projection of *Argo* on Earth's  
     surface 240, 241-250-1,  
     252, 272-3, 275, 282-5,  
     299, 300  
 Proteus 421, 426, 429  
 Ptah *see* Hephæstus  
 Ptolemy III Euergetes 157  
 Ptolemy, Claudius 240, 316-19,  
     516&en  
 pulsars 166  
 Puttkamer, Jesco von 13-14  
 Pyramid Texts 134, 370, 376  
 pyramids, Egyptian *see* Giza  
 Pyrrha 165  
 Pythagoras/Pythagoreans 19  
     427&en  
     Comma of 35-7  
     and harmony 271, 322  
     Particle of 37  
     and Proclus 511, 513-14,  
     533, 538-9  
     *see also* Polyhistor  
 Python 335, 336, 338; *see also*  
     Typhon  
 Pythoness (Sibyl at Delphi)  
     347&en  
*Qeta*, *Qeti* and *Qetshu* 328, 337  
 'quantum potential' 43-4  
 Quincey, J H 280, 298  
 r in Egyptian 194-5, 230, 390  
 Rā/Re (deity) 125, 140, 173  
 radio signals *see* signals  
 'Raffles shipwreck' 69  
 Ramses II, King of Egypt 209,  
     212, 214  
 Ramses IV, King of Egypt 173  
 Re *see* Rā  
 Reason, Osiris/Anubis as 145-  
     6  
 reed huts 454-5  
 Reisner (archaeologist) 278  
 religion  
     fanatical 465-6, *see also*  
         Christianity; deities  
*renard pale* *see* pale fox and  
     *under* Grigale  
 repopulation with stones and  
     bones 180, 219, 221, 256,  
     295, 327, 350; *see also*  
     resurrection  
 repulsive amphibians 413-417-  
     18, 463, 553  
 resurrection 219, 221  
     *see also under* Nommos  
     *see also* repopulation  
 Rhea (deity) 265

# INDEX

- Rhodes** 264, 294, 317, 344&n  
 ring symbol 255, 352  
 rising and setting *see under* stars  
 rocket propulsion 447-8  
**Romans** 260, 280  
     major authors *see*  
         Macrobius; Tacitus  
         Ponderosus *see* Wazn  
**Ronan, Colin** 304  
**Roscher, Wilhelm** 196-7, 267,  
     278, 280, 639  
 rotation of planets/stars 100,  
     101, 111, 146, 519-543-4;  
     *see also* orbits  
**Roux, Georges** 587  
 rowers *see* oarsmen  
 'Rudder' *see* Canopus (star)  
**Russia** 290  
  
**Sacca, feast of** 559  
 sacred fract on (<sup>2b</sup>243) 38  
 'sacred Isle' *see* Delos  
**Sacred Year** 384-7 doubled *see*  
     Great Year  
**saffron** 228-9, 238  
*sagala see* heavy under metal  
**Sagan, Carl** 82-3, 88, 90, 416,  
     468, 475  
**Saglio, Edmond** 428-31, 472  
**Sah/Sah (Orion)** 130, 133, 221  
**Sakkara/Saqqara, Step**  
     Pyramid of 20, 154  
**Samson, Edward** 598, 607  
**Sanga** 483, 495, 500  
**Sangha CP 3**  
  
**Sanskrit** 139, 141, 142, 164,  
     230-1, 232, 364, 368, 382,  
     426, 567  
**Santillana, Giorgio de** 139,  
     183, 251, 297-521, 568,  
     572  
**Santorini see** Thera  
**Saqqara see** Sakkara  
**Sardis** 259-276, 294, 297  
**Sargon II King of Assyria** 248,  
     430  
**Saros cycle** 567, 574  
**Sarton, George** 506, 521, 530,  
     532  
 satellites *see* moons  
**Saras (deity) and celestial boat**  
     135, 137, 139, 188, 227  
**Saturn (deity) see** Cronos  
**Saturn (planet)**  
     and Dodoma 295  
     and Dogons 104, 106, 107  
     ring of 106, 107  
     tenth moon of *see* Phoebe  
**Schofield, J N.** 589  
**Schwaller de Lubiez, R A.** 19,  
     21, 56  
**Scorpio (constellation)** 642  
**Scott, Michael** 328-9  
**Scylax** 242&n  
**Scylla (deity) Pl.** 29, 423, 425-  
     6, 430  
**Scythia** 268, 269  
*seb (Mercury and cedar)* 183,  
     295  
*seiren* 136-7

# THE SIRIUS MYSTERY


- Serios** *see* **Sirius**
- Seker** (deity) 389; *see also* **Carce**
- Sevucus** 523-1
- Selloi** *see* oracular *under* priests
- Semitic languages** 90
- Sept** (star) 130, 133; *see also*  
**Sirius**
- Sept** as wood 189
- Serapis** (deity) *Pl.* 31, 146, 232,  
 643-4  
**Serapeum** (temple) 240, 343  
*see also* **Apis** the bull; **Osiris**
- serpents**  
 gods as half *see* deities *under*  
 duality guardian 267, 280,  
 349  
 of Castalian Spring 349, 352  
 hieroglyph 359  
 teeth 361 2, 375, 391, 400-1,  
 640, 641  
*see also* deities *under* duality
- Servetus, Michael** 108
- Sesostris** *see* **Ramses II**
- Seth/Set** (deity) 429, 438, 450  
 children of 206, 207  
*see also* **Typhon**
- Seth I, King of Egypt** 142, 173
- seven**  
 caves in underworld 191 2  
 Chinese amphibians 439  
 days 223  
 degrees of latitude 257  
 gods of destiny 190  
 ute/lyre strings of **Apollo**  
 255, 257  
 notes of octave 251, 257,  
 271, *see also* oracle *under*  
 octaves  
 paths of progress in  
 Freemasonry 605-6  
 planets 271, 526  
 Sages' *see* **Annedoti**; **Oannes**  
 times seven *see* forty-nine  
 underworld gods and caves  
 190-2, 238  
 vowels 255, 257, 581-2  
 years 479, 487
- seventy**  
 days 190-1, 192, 340  
 and seven in underworld  
 190-2, 238  
*shâr/sha/sha-t* 394  
**Sharaba** (city) 398  
 sheep *Pl.* 24  
*see also* **Golden Fleece**  
*shenut/shent/shenn* 371-3
- ships** *see* **boats**
- Shklovski, I S** 82 3, 88, 475
- Shu** (deity) 196  
*shu/shuba* 196
- Sicily** 216
- Sidon** 259, 291, 294
- sigi tola* 484
- signals**  
 beacons 279-81  
 from stars, search for 79-80,  
 85, 467  
**Sigui**, ceremony *CP* 5-6; *Pl.* 8;  
 330, 388, 477, 564  
 calculation of time of 478-

- 80, 481-2, 483, 484, 571  
 silver, words for 367 9  
 Sima Chien and Sima Zheng 437  
 Simplicius 326, 353, 512  
 Siorvanes, Lucas 545-6  
 Sipyus, Mount 259, 294, 297  
 sirens 136-7  
 Sirigi mask 450, 452  
 Sirius A (main star of Sirius system)  
   as 'eighth planet' 271-2  
   as focus of ellipse 97, 101  
   Isis as 152, 221  
   mass of 47  
   photograph of *Pl. 1*, 82  
   *see also* Sirius system  
 Sirius B  
   discovery and first  
     photograph *Pl. 1*, 65, 81  
     82, 115, 636-7  
   as 'eye star' 132, 475  
   gravity 81  
   heat of 115  
   invisibility and darkness 65,  
     94-5, 229, 272, 338-40,  
     357  
   mass of 35, 81, 100, 138, 163  
     and our Sun's mass 39-43,  
     47  
   named after *Digitaria* seed 67  
   and Nephthys 134-5, 198,  
     350, 366, 376, 391  
   orbit 139-40, 163, 235,  
     236-7, 272  
   and *arg* 364  
   close to forty-nine years 385  
   and Corus 328  
   and Dogons 63 4, 65, 96,  
     98, 99, 101, 224n, 386-  
     7, 485, 486, 487 8  
   speed 170, 198  
   twinned as hundred 223-  
     48n  
   and *uraet* 393  
   *see also under* Anubis  
   origin and features 489-90,  
     491, 492  
   and Orion 197  
 Osiris as 161 2, 378  
   position 94  
   and pyramids 35  
   radius of 46  
   rays of 204  
   rotation 100, 101, 146  
   Typhon as 338  
   and Uranus 271 2  
 Sirius C  
   discovered 81-2, 103  
   and Nephthys 377-8  
   orbit 114, 224n  
   planet of 102  
   as 'star of women' 102, 344,  
     492, 493, 495  
 Sirius system and mystery 3-60  
   daily life in 452-9, 469-70  
   and Danos 341 2, 343-4,  
     385, 403

- described 61-76
- and Dogon *see under*
  - cosmology of Dogons
  - and Freemasonry 605-6
  - gods associated with 121-67
  - Hittites at Hebron 584-91
  - and Isis 152, 161, 166, 365
  - not chosen for radio signals
  - research 80
  - planets of 96-9, 102, 114
  - and pyramids *see* Giza
  - Plateau
  - reactions to first edition 5-16
  - see also* amphibians:
    - Berossos, Bow Star, dog,
    - Dogon, heliacal rising;
    - numbers; oracle centres;
    - Proclus, Sirius A, Sirius
    - B, Sirius C, teeth
  - Sisithrus/Xisuthrus, King of
  - Chaldeans 549-50, 554-5
  - Siwa oasis, oracle of Ammon at
    - 241, 282-298, 301, 335,
    - 395, 465
- six 500
  - Chinese amphibians 439
- 'sixth earth' *Pl.* 9; 1.0
- sixty
  - reduced to fifty 501
  - stones of Stonehenge 567
  - in Sudar 501
  - twenty year subdivision of
    - 568-9
  - twenty year subdivision of
    - 483
- years 388, 564-78
  - orbits of Jupiter and
  - Mercury synchronized
    - 562, 565-6, 568-9, 572-
    -
  - reign of Dogons 487-8
  - see also* Signi ceremony
- Sma *see* Typhon
- Sokar (deity) 291
- solar system
  - Dogon view of *see under*
  - Dogon
    - extra star in 59
    - see also* planets, Sun
  - Songho (village) *CP* 1, 4,
  - sons *see under* fifty
  - 'Sorghum-Female' (*emme ya*)
    - 492, 493, 494-5
  - Sosipatra 342
  - Sothis (Sirius, deity) 152
    - calendar, Sothic/Egyptian
    - 124, 128, 190
    - and celestial boat 135, 137,
    - 139, 188-9, 206, 227
    - death and rebirth 12,
    - Hecate as 218
    - as Isis 143, 153, 189, 204
    - 350, 359, 377
    - and wind 146
    - see also* Isis, Sirius
  - sown men *see* 'earth-born'
  - Sparta (Sown Men) 349-50
  - Spd and Spdt 130; *see also*
  - Sothis
  - Speiser, E.A. 171, 173-194,

# INDEX

- 233
- Sphinx 16-17, 20  
 and Anubis 17, 32, 424-5  
 and Ark words 366  
 as child of Echidne and  
 Orthrus 432  
 as dog 17 423-4 431  
 not visible to Herodotus 25,  
 29  
 water and 18, 21-2, 23-5, 30-  
 1
- spontaneous creation of  
 complexity 43
- stag-king 223, 236
- star clocks 128, 172, 173, 213-  
 14
- stars  
 essence, heavy 184, 186-8,  
 202 risings of (and  
 decans) 130, 231, 361,  
 401, *see also* heliacal rising  
 star-map 348  
 of tenth moon 51-2  
*see also* constellations; dwarf  
 stars, mass/weight,  
 Sirius, Sun *and under*  
 cosmology *and* orbits
- Status 211
- Steccluni, Lavinio 253, 274, 276-  
 7, 282, 285, 288-91, 297
- Step Pyramid of Saqqara 20,  
 154
- Stephenson, D.G. 512, 60
- Stobaeus 161
- Stonehenge 567
- stones 221-3, 349-50  
 buildings 207, *see also* Giza  
 and Minyae 222-3  
 repopulation with 180, 219,  
 221, 256, 295, 327, 350  
*see also* bones, omphalos,  
 teeth
- Strabo 395
- strength *see* mass
- Stubbings, F.H. 216
- Suda/Suidas 1738n
- Sudanese Sirius system 132,  
 476-98; *see also* Sirius  
 system *under* cosmology
- Suhail/Suhel/Sihl 248
- Sumerians and Babylonians  
 -Akkadians 90-1, 140, 170-5,  
 207  
 and amphibians 55, 90-1,  
 426-7, 552-4, 562-3  
 Ark and Deluge 49, 91, 244,  
 427  
 buildings 207  
 and China 575  
 cylinder seal and heliacal  
 rising of Sirius *Pl.* 25, 139  
 and Egypt, links with 140-2,  
 163, 166, 168-204, 404  
 language 90, 140, 141  
 mathematics in New Guinea  
 69  
 myths and legends 49, 55,  
 90-1  
 and oracle centres *Pl.* 17,  
 259, 284, 297, 432

- origins of civilization 20, 23,  
73  
reed huts 454-5  
and sacred fifty 170-5, 177  
83  
*see also* Berossos, Marduk  
'Sun Gate' (Tiahuanaco) 22  
Sun, our  
and Delphi 295  
gods *see* Helios, Rā  
and Horus 146, 164, 219  
Kephren's Pyramid  
representing 35  
mass 39-43, 47, 59  
ratio of radius to that of  
Sirius B 46  
revolution 47  
shadow, measuring 308-16  
symbol, *see* Golden Fleece  
*see also* heliacal rising,  
planets, Ra, stars  
superdense matter *see* mass  
*under* Sirius B  
Sura (hero) 232  
Su-Shu Huang 84  
suspended animation, aliens in  
48, 52 405, 449  
swallow carrier- 279  
Syncellus 420  
Syria/Syrians 210 *see also*  
Sumerians  
  
Tacitus 177  
Täckholm 229, 235  
tails, fish and serpent *see* deities  
*under* dualty  
'take-off point' *see under* high  
civilisation  
Tarn, W. W. 240, 264  
Tat *see* Thoht  
Tau Ceti (star) 79, 84  
Taylor, Thomas 235, 353, 504-  
5, 512, 525 30, 542, 546,  
565  
*tchens/tens/tchum* 375-9  
Tchenteru 370-1  
teeth (mainly dragon's) *Pl.* 22-3,  
and dog as same word 393-4,  
  
of dolphins 459-60  
of dugongs 462  
and Gilgamesh 175, 180-1,  
199, 327, 352, 598  
of Hercules 598  
hieroglyphs 351, 352-3, 393,  
400, 403, 460  
and Jason and *Argo* *Pl.* 23,  
175-6, 199, 327, 348, 359,  
362, 375, 400, 640  
of Nommos 456, 462  
serpent's 161 2 375, 391,  
400-1, 640, 641  
three sets of 598, 607  
*see also* bones and *under*  
Gilgamesh and Jason  
*tchen/Tehenu* 377  
Telephassa (Argiope) 347  
Tel. el-Amarna 286  
Tem (deity) 376  
Temple, Robert K.G.



# INDEX

- on Chma 58, 108, 306
- Conversations with Eternity*
  - 149, 254, 279, 301 319n
- on extra star in our solar system 59
- family and Freemasonry 600-4
- on Gilgamesh 319n, 427, 472, 643
- Universal History* 355
- ten days a week 172, 190-2, 199
- tenth moon (and star of) 49, 51-2, 447-8, 449
- tep/tephsi* 379-80
- textiles *see* weaving
- Thebes (Egypt) 149
  - location 225, 241, 361
  - new city to replace 287
  - and oracle centres 248, 272, 274, 275, 282, 301
  - and serpent's teeth 361, 362
- Thebes (Greece) 176, 225, 347
  - Castalian Spring 349, 352
  - Pithulodes 362
  - and serpent's teeth 361-2
- Theophrastus 293, 299, 520, 544
- Thera (Santorini) 317, 347
  - eruption of 215
  - oracle centre 253, 259, 261, 273, 294, 300
- Theseus 211, 216
- Thesiger, Wilfred 454, 474
- Thesmophoria 345&n, 365, 401
- Thespiac (city) 321
- Thestios/Thespius and fifty daughters 196 321-7, 355
- thirty-two year orbit 114
- thirty-year orbit *see* orbit under Saturn
- Thompson, D'Arcy W. 220, 235
- thorn hieroglyphs 351
- Thoth/Tat (deity) 154
- three
  - Cyclopes 255-6
  - goddesses in Sothis-boat *see* under celestial boats
  - heads of Cerberus 227, 237, 325, 336
  - heads of Hecate 218n, 227 325, 336
  - holes in mask 480
  - sets of teeth 598, 607
  - thuds 427
- thrones 346, 402
  - of Anunnaki 189, 192, 200-1 343, 358, 366, 372, 374
  - hieroglyph 133, 343, 358, 374, 392
  - with eye hieroglyph 131 161, 189, 201
- Tiahuanaco (Bolivia) 22
- Timbuctoo 92 332, 334
- time
  - Anubis as 143-4, 145, 162, 164
  - beginning and end 364, 380
  - curonos* and Cronos 145

- between nar strokes 329, 356  
 Sigui *see* calculation *under*  
     Sigui  
 star clocks 128, 172, 173,  
     213-14  
*see also* calendars, days,  
     months; years  
 Tlingit people 89  
 Tomaros, Mount 259, 282, 294  
 Tompkins, Peter 271, 274.  
     290-1, 297  
 tooth *see* teeth  
 trees  
     codes and alphabets 291-3,  
         295, 335, 639  
     Cosmic 594  
     Graves on 291, 293, 298-9  
     *see also in particular* acacia,  
         cedar, oak, palm  
 triangle 402, 427  
 triple *see* three  
 Triple Goddess *see* Hecate  
 Trismegistic literature (Book  
     of Hermes) 146, 150-2,  
     206-7  
     'Virgin of the World' 152-9,  
         165-6, 433  
 Trita/Aptya (deity) 426-7,  
     429-30  
 Triton (amphibian) 426-30  
 Triton Lake/Tritonis (Libya)  
     428  
     Athene born beside 295,  
         333, 426  
     oracle centre at 254, 259,  
         265, 294-5, 426  
 Triton. River (Crete and  
     Boeotia) 265, 428  
 Tnat *see* underwater  
 Tutankhamen (Tutankhaten),  
     King of Egypt 277  
 Tutu (deity) 196  
 Turu, Archbishop Desmond  
     466  
 twelve  
     gods 383  
     months 172, 199  
     year gestation of Fuxi 437  
 twenty-four 383, 484  
 twenty-two parts of Nommo's  
     body 464  
 twenty-year subdivision of  
     sixty 482, 483, 568-9  
 twinning *see* duality  
 two  
     circuits 372  
     heads 336, 371  
     hundred and ninety-four 59  
     to-one ratio *see* duality  
 Typhon 229, 429-32  
     children with Echidne 336,  
         431-2. *see also* Cerberus,  
         Orchus, Sphinx  
     and darkness 357  
     fifty heads of 196, 431  
     hundred heads of 430  
     iron as bone of 147-8, 378  
     meaning of name 357  
     and Zeus, battle between  
         260, 430, 432

# INDEX

- Tyre 321, 322  
 Tyrrhenus (deity) *Pl.* 30
- uas/Uasar* 377  
 Udaeus 349, 351  
 Ulysses (Odysseus) *see Odyssey*  
 underworld 340, 366, 392  
     seven and seventy  
     symbolism 190-2, 238  
     *see also* Cerberus, darkness,  
     'Other World'
- uraet/Uraet*: goddesses 393  
 Uranus (deity) 204, 376n  
     children of (monsters and  
     Cyclopes) 212, 256, 325-  
     9, 341, 356  
 Uranus (planet) 198, 271-2  
 Ursa Major 381  
 Utnapishtim *see* Ziusudra
- Valley Temple 25  
 Venus (deity) *see* Aphrodite  
 Venus (planet) 58-105, 1-2,  
     295, 539  
 'Virgin of the World' *see under*  
     Tismegistic
- volcanic eruption 215  
 vowels 255, 257  
     E at Delphi *Pl.* 21-311, 579-  
     82  
 Vrihaspati (Brihaspati) 567
- Wallis Budge, Sir E.A. on  
     Egypt 134n, 235  
     Anubis 135, 143-4
- Ark words 366-8  
*heru* 23.  
 hieroglyphs 131, 352  
 influence upon Roman  
     architecture  
 Isis and Osiris 131-4, 143-6  
 life and death texts 366-7  
 and Plutarch 145-6  
 Qet 328  
*shen* 371, 372n  
 silver 367-9  
 Sirius system texts 370-1  
 and Sumerians 141-2, 164,  
     170, 173, 194-6  
*tshum* 376, 379
- water**  
 in alien ships 49  
 of Babylon 561  
 fresh and sea 45.-2  
 and Giza Pyramids and  
     Sphinx 18, 21-2, 23-32  
 underground system 396-7  
 watery planets 136, 452-9  
*see also* amphibians;  
     Deluge/Flood
- Al Wazn  
     (Wezen/Pondersosus,  
     heavy star) 135, 137-8,  
     163, 188, 243, 299; *see also*  
     essence
- Wazouba 489  
 weaving 210, 278, 503  
 Webber, Charles E. ('Ted')  
     601-4  
 week *see* days

# THE SIRIUS MYSTERY

- weight *see* mass/weight  
 Wellard, James 395-6, 398  
 werewolf 346  
 West, John A. 18-21, 23  
 Wezen *see* Wazn  
 white and black acacia 293  
     *see also* under dwarf stars  
 Wiener, Norbert 148n. 512  
 Willoughby-Meade, G. 441. 474  
 willow 293, 295  
 wings. 'men with' *Pt* 9; 110  
 wolf 344-6, 358; *see also* dog  
 Wood, Bishop Maurice 465  
 wool *see* Golden Fleece  
  
 Xenocrates 521  
 Xsuthrus *see* Sisithrus  
  
 Yahweh (deity) *see* Jehovah  
 yalu ula *see* Milky Way  
 Yasigi/yasigi tolo 484, 496-7  
 years  
     fifty *see* orbit under Sirius B  
     four 324  
     fourteen 479  
     hundred and twenty 389, 566  
     seven 479, 487  
     thirty-two 114  
     twelve 291  
     *see also* Great Year; months:  
         Sacred Year *and* under  
         sixty  
 Yebéne *Pt* 6; 477  
 Yixing/I Hsing/I Xing 306,  
     307, 312-14, 318, 575  
 Yougo Dogoron 478-9, 492, 500  
 Young, Arthur M. 61 3, 68. 75  
 Yourougou. (star) 497, 503  
 Yü, Emperor of China 438  
 yuruga *see* pale fox  
  
 Zarathustra *see* Zoroastrianism  
 Zeus/Jupiter (deity) 149, 232,  
     255. Amen/Ammon-  
         Jupiter 229  
     Apollo as prophet of 262-3  
     and Athena 147  
     birth of 265, 295  
     and Cronos 145, 204  
     cults *see* Dodona, Siwa  
     and Deluge 429  
     and Golden Fleece 222  
     and Io 643  
     and Kasios 260, 294  
     as Oannes 165, 420, 571  
     oracle of *see* Dodona  
     Plutarch on 420, 571  
     and Typhon, conflict  
         between 260, 430. 432  
 Zheng Xuan 310  
 ziggurat 207, 376, 379  
 Ziusadra (Utnapishtim) 180,  
     244, 291, 454-5  
 Zodiac 152, 284, 383  
 Zoroastrianism/Zoraster  
     (Zarathustra) 154, 382  
     38n  
 Zoser, King of Egypt 154, 155-6  
  
*Indexed by Ann Hall*



How is it possible for the ancient traditions of an African tribe to contain detailed data on the star Sirius which modern astronomers have only just discovered?

The most secret and sacred traditions of the Dogon tribe in West Africa maintain that the existence of civilisation on earth is a result of contact from inhabitants of a planet in the system of the star Sirius, in approximately 3,000 BC. Central to their cosmology is a body of knowledge concerning the system of the star Sirius that is astounding in its accuracy of detail, including specific information only recently accessible to modern science. Many authors have speculated on the subject of extraterrestrial contact in ancient times, but never before has such detailed evidence been presented.

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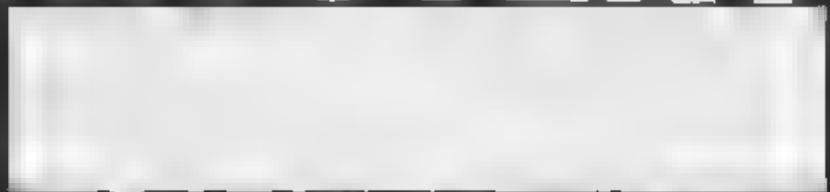


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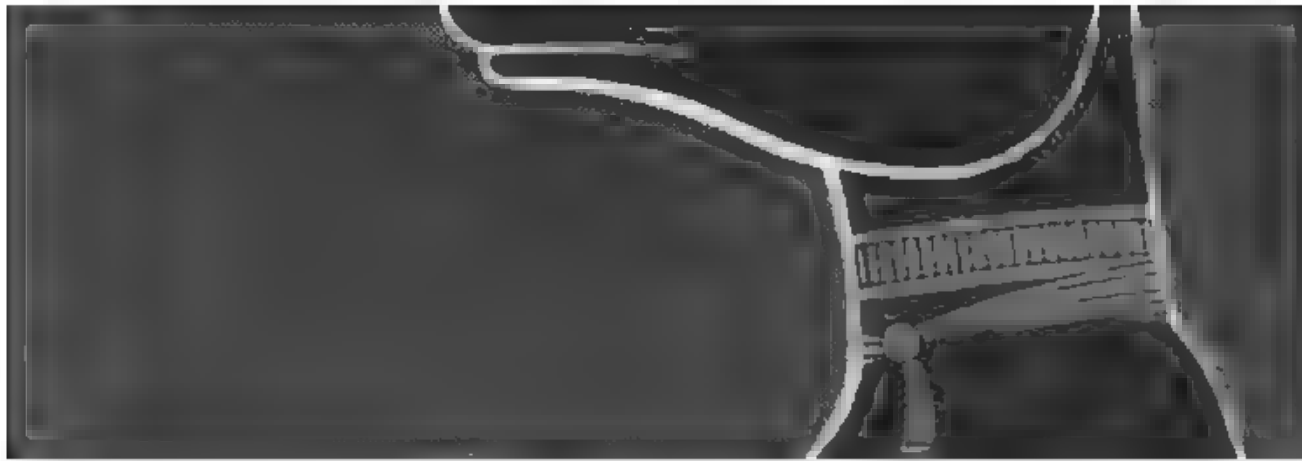
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# THE SIRIUS MYSTERY



**Robert K.G. Temple**





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viii

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r K G t

Acknowledgements

Author's Note

What is the Mystery?

## CONTENTS

page

xi

## TO THE READER

## I

## PART ONE

The Sirius Question is posed

1 The Knowledge of the Dogon 11

A Sudanese Sirius System by M. Griaule and G. Dieterlen 35

## PART TWO

The Sirius Question is rephrased

2 A Fairytale 55

3 The Sacred Fifty 82

4 The Hounds of Hell 101

5 The Oracle Centres 121

6 Origins of the Dogon 153

7 The Rising of 'Serpent's Tooth' 175

8 A Fable

## PART THREE

Beyond the Mystery

## APPENDICES

I The Moons of the Planets, the Planets around Stars, and Revolutions and Rotations of Bodies in Space Described by the Neoplatonic Philosopher Proclus	223
II The Surviving Fragments of Berossus, in English Translation	248
III Why Sixty Years?	258
IV The Meaning of the E at Delphi	265
V Why the Hittites were at Hebron in Palestine	268
VI The Dogon Stages of Initiation	273
Bibliography	
Index	
283	

## AUTHOR'S NOTE

Summaries follow each chapter in Part Two. The sheer amount of the material dealt with makes it advisable for the reader to put it into a smooth perspective by reading over these summaries which have been prepared so that the reader may refresh his memory if he wishes. The author can offer no apology for the complexity of the material, but he can present these slight aids for its comprehension.

Every effort has been made to trace the ownership of all illustrative material reproduced in this book. Should any error or omission in acknowledgement have been made the author offers his apologies and will make the necessary correction in future editions.

## What is the Mystery?

The question which this book poses is: Has Earth in the past been visited by intelligent beings from the region of the star Sirius?

When I began writing this book in earnest in 1967, the entire question was framed in terms of an African tribe named the Dogon, who live in Mali in the former French Sudan. The Dogon were in possession of information concerning the system of the star Sirius which was so incredible that I felt impelled to research the material. The results, in 1974, seven years later, are that I have been able to show that the information which the Dogon possess is really more

than five thousand years old and was possessed by the ancient Egyptians in the pre-dynastic times before 3200 B.C., from which people I show that the Dogon are partially descended culturally, and probably physically as well.

What I have done, therefore, is to push back by over five thousand years the terms of reference of the original question, so that it now becomes more tantalizing than ever. But now that I have done that, it becomes less easy to answer. The Dogon preserve a tradition of what seems to have been an extra-terrestrial contact. It is more satisfactory not to have to presume the preposterous notion that intelligent beings from outer space landed in Africa, imparted specific information to a West African tribe, then returned to space and left the rest of the world alone. Such a theory never really struck me as possible. But in the beginning it did have to serve as a working hypothesis. After all, I had no idea that the Dogon could have preserved ancient Egyptian religious mysteries in their culture. I also had no idea that the ancient Egyptians knew anything about Sirius. I was in that state of ignorance so common among people who know nothing more about ancient Egypt than that the Egyptians built pyramids, left mummies, had a Pharaoh named Tutankhamen, and wrote in hieroglyphs. My own academic background concerned oriental studies, but I never touched on Egypt except regarding the Islamic period after A.D. 600. I knew almost nothing whatsoever about ancient Egypt. If I had, perhaps I might have saved myself a lot of time.

It took many, many months for two or three small clues to work themselves around in my head long enough to force me to study ancient Egypt and a whole range of subjects which I had never previously tackled. I doubt if, even then, I could have been persuaded to spend considerable sums of money such as the necessary fifty pounds for the essential and out-of-print *Wallis Budge Egyptian Hieroglyphic Dictionary*, which consists of 1,356 pages and cannot even be lifted off the table by a ten-year-old child. But as fate would have it, I was

## 2

## THE SIRIUS MYSTERY

actually given one of these huge dictionaries, along with many other essential books on the subjects with which I needed to become concerned. This helped overcome my natural disinclination to erect a camp bed in some scholarly library and move in for a couple of years. I must therefore note my debt to my dear friend the late Miss Mary Brenda Hotham-Franklyn for giving me in the ninety-fourth year of her life what amounted to a sizeable library of books, which were so interesting that I found it impossible to neglect them, and the result is now before us.

This entire matter of the Sirius mystery first came to my attention around 1965. I was working on some philosophical and scientific problems with Arthur M. Young of Philadelphia, the inventor of the Bell helicopter and more recently (1972) co-editor of and contributor to the book *Consciousness and Reality*. Arthur single-handedly taught me more science concurrently with my official

university studies from 1961-7 than an entire university faculty might have done. For while I was ploughing my way through the Sanskrit language and other onerous subjects at the official university level, I imbibed a considerable scientific education from Arthur in company with a few friends from the university with whom I participated for years in a series of extremely stimulating seminars and research projects supervised by Arthur Young and occasionally linked to a philanthropic foundation which he had established, entitled the Foundation for the Study of Consciousness.

Arthur Young had a particular passion for reading about mythologies from all over the world, including those of obscure tribes. One day he showed me a book entitled African Worlds, which contained several chapters, each dealing with a different tribe, with its views of life and its customs and mythology. There was a chapter about the Dogon translated into English from the French of Marcel Griaule and Germaine Dieterlen, the eminent anthropologists. I

Arthur pointed out to me a passage he had just read in this chapter, in which these anthropologists were describing the cosmological theories of the Dogon. I shall quote the paragraph which I read then, which first brought to my attention this whole extraordinary question, so that the reader will begin this subject just as I did, with this brief reference:

"The starting point of creation is the star which revolves round Sirius and is actually named the "Djigitaria star", it is regarded by the Dogon as the smallest and heaviest of all the stars, it contains the germs of all things. Its movement on its own axis and around Sirius upholds all creation in space. We shall see that its orbit determines the calendar.

That was all. There was no mention by the anthropologists of the actual existence of such a star which revolves around Sirius. Now Arthur Young and I both knew of the existence of the white dwarf star Sirius B which actually does orbit around Sirius. We knew that it was the smallest and heaviest type of star then known (Neutron stars and black holes were not much discussed and pulsars had not yet even been discovered.) We both naturally agreed that this was a most curious allusion from a supposedly primitive tribe. How could it be explained? I had to let the matter drop, due to other activities and concerns at that time.

Approximately two years later in London, I suddenly was struck by the irresistible urge to investigate this question. I was prompted to do so by reading

## WHAT IS THE MYSTERY ?

3

the rousing futuristic essays of Arthur C. Clarke, whom I had come to know by then. By this time I could not even remember the name of the African tribe, so I wrote to Arthur Young for it. He replied and kindly sent me a photostat of the entire chapter I had seen in African Worlds. So, armed with the knowledge that it was a tribe called the Dogon that I was after, I bravely

made my way to the Royal Anthropological Institute to see what I could find out about this peculiar tribe

The librarian went over the catalogue listings with me and I ran into a problem: everything was in French, and I did not know French. However, I persevered and found an article listed which included the word 'Sirius' in its title. That looked promising (for nothing else did). I asked for a photostat. When I picked this up a week or two later (in early November 1967) I was unable to make any sense of it, of course. So I eventually found someone to translate it for me in return for a fee. Finally I was presented with the material in English – and it was quite as rewarding as I could have wished.<sup>2</sup> For this article dealt exclusively with the most secret of all the traditions of the Dogon which, after years of living with them, the anthropologists Griaule and Dieterlen had managed to extract from four of their head priests,<sup>3</sup> after a special priestly conference among the tribe and a 'policy decision' to make their secrets known to Marcel Griaule, the first outsider in their history to inspire their confidence.

The most secret traditions of the Dogon all concern the star which the Dogon call after the tinest seed known to them, the botanical name for which is *Digitaria*, and which is thus used in the article as the name of the star instead of the actual Dogon name, *po*. However, even in this article which deals exclusively with this subject, Griaule and Dieterlen only mention the actual existence of a star which really exists and does what the Dogon say *Digitaria* does, in a passing footnote and in this brief remark: 'The question has not been solved, nor even asked, of how men with no instruments at their disposal could know the movements and certain characteristics of stars which are scarcely visible. But even in saying this, the anthropologists were indicating their own lack of astronomical expertise, for the star, Sirius B which revolves around Sirius, is by no means 'scarcely visible'. It is totally invisible and was only discovered in the last century with the use of the telescope. As Arthur Clarke put it to me in a letter of 17 July 1968, after he had suggested he would check the facts: 'By the way, Sirius B is about magnitude 8 – quite invisible even if Sirius A didn't completely obliterate it. Only in 1970 was a photograph of Sirius B successfully taken by Irving Lundenblad of the U.S. Naval Observatory: this photograph is reproduced in Plate I.

In the article which I had obtained from the Royal Anthropological Institute, Griaule and Dieterlen recorded that the Dogon said the star *Digitaria* revolved around Sirius every fifty years. It didn't take me long to research Sirius B and discover that its orbital period around Sirius was indeed fifty years. I now knew that I was really on to something. And from that moment I have been immersed in trying to get to the bottom of the mystery.

Arthur C. Clarke was extremely helpful during the next few months. He wrote from Ceylon and was fairly often in London, so he and I also discussed at great length many of the mysterious facts from around the world which have since been given such public prominence by the Swiss-German author Erich

von Daniken in his best selling book Chariots of the Gods and its sequels. At first I found myself preparing a book on all these exciting mysteries. (No one had at that time heard of von Daniken.) Arthur Clarke introduced me to one interesting professor after another. Each with a pet mystery and his own. Derek Price, Avalon Professor of the History of Science at Yale University, had discovered the true nature of the now famous mechanical computer of approximately 100 B.C. found in the Antikythera shipwreck at the turn of the century and unappreciated until it was dropped on the floor in Athens, cracked open and they saw what it was. He also had found traces of Babylonian mathematics in New Guinea and talked a lot about 'the Raffles shipwreck'.

Then there was Dr Alan McKay, a crystallographer of Birkbeck College at the University of London, who was interested in the Phaistos Disc of Crete, in a mysterious metal alloy found in a Chinese tomb, and in the wilder stretches of the Oxus River. I found that, with people like this around every corner, I was rapidly becoming distracted from my true quest by so many glittering riddles.

I therefore abandoned all those mysteries and determined to concentrate in depth on cracking the one really hard and concrete puzzle that I had been initially confronted with: how did the Dogon know such extraordinary things and did it mean that the Earth had been visited by extraterrestrials?

The trouble with trying to undertake a serious investigation about the possibility of extraterrestrial contact with Earth, is that a lot of sensible people will be put off by the very idea. Then again, a lot of the people who will enthusiastically receive my researches with open arms are the sort of people one least wants to be classed with. I have therefore undertaken all the work on this subject with a certain degree of reluctance, and if anyone pressed me during several years to say what I was doing and they extricated from me the confession that I was working on a book, I did not say what it was about, but merely mumbled it was 'about the ancient Egyptians' or, before that stage 'about the mythology of some tribe in Africa' not very interesting, really. This book will inevitably, I suppose, put me in that most unenviable category of 'those people who write about little green men from outer space'. However this is meant to be a serious inquiry. I am tempted to apologize for the subject, but that would be pointless.

It is important that this strange material be placed before the public at large. Since learning was freed from the tyranny of the few and opened to the general public through first the invention of printing and now the modern communications media and the mass proliferation of books and periodicals and more recently the 'paperback revolution', any idea can go forth and plant the necessary seeds in intellects around the world without the mediation of any panel of approval or the filtering of a climate of opinion based on the currently accepted views of a set of obsolescent individual minds.

How difficult it is to keep in mind that this was not always the case. No wonder, then, that before such things were possible, there were secret traditions of priests which were handed down orally for centuries in unbroken chains and carefully guarded lest some censorship overtake them and the message be lost. In the modern age, for the first time secret traditions can be revealed without the danger that they will be extinguished in the process. Can it be

## WHAT IS THE MYSTERY?

5

that the Dogon came to realize something of this when, through some powerful instinct and after mutual consultations among the highest priests, they decided to take the unprecedented step of making public their highest mysteries? They knew they could trust the French anthropologists, and when Marcel Griaule died in 1956, approximately a quarter of a million tribesmen massed for his funeral in Mali, in tribute to a man whom they revered as a great sage equivalent to one of their own high priests. Such reverence must indicate an extraordinary man in whom the Dogon could believe implicitly. There is no question but that we are indebted to Marcel Griaule's personal qualities for laying open to us the sacred Dogon traditions. I have now been able to trace these back to ancient Egypt, and they seem to reveal a contact in the distant past between our planet Earth and an advanced race of intelligent beings from another planetary system several light years away in space. If there is another answer to the Sirius mystery it may be even more surprising rather than less so. It certainly will not be trivial.

It should not surprise us that there must be other civilizations in our galaxy and throughout the entire universe. Even if the explanation of the Sirius mystery is found to be something entirely different in the years to come (though I cannot imagine what), we should bear in mind that, as we are definitely not alone in the universe, the Sirius mystery will have served to help us speculate along proper and necessary lines, and opened our innately lazy minds that much further to the important question of extraterrestrial civilizations which must certainly exist.

At the moment, we are all like fish in a bowl, with only the occasional leap out of the water when our astronauts go aloft. The public is becoming bored with space exploration before it has even really begun properly. We even find that Congressmen need continual injections of 'space rescues' and satellite gaps in their tired bloodstreams, like a heroin fix, in order to stimulate them in their horrible state of lethargy to vote funds for the space programmes which so many of them consider a bore and lacking in excitement and suspense.

The psychological impact of photographs of the Earth from space, a giant and beautiful orb resting on nothing, pearled with clouds and sparkling with sea, has begun to send resonances down the long and sleepy corridors of our



largely drugged psyches. Mankind is imperceptibly struggling to the new and undeniable realization that we are all in this game together. We are all perched on a globe suspended in what appears to be emptiness, we are made up of atoms which are mostly themselves emptiness, and above all, we are the only really intelligent creatures directly known to us. In short, we are alone with each other with all the fratricidal implications of such a tense situation.

But at the same time as we are all slowly realizing these things, the inevitable conclusion which follows upon all this is beginning to make some headway with us as well. It has begun to occur to more than a handful of exceptional people (exceptionally intelligent or exceptionally insane) that if we are sitting here on this planet fighting among ourselves for lack of any better distraction, then perhaps there are lots of planets all over the universe where intelligent beings are either sitting and stewing in their own juice as we are, or where those beings have broken out of the shell and established contact with other intelligent beings on other planes or planets. And if this is really going on all over the universe, then

## 6 THE SIRIUS MYSTERY

perhaps it will not be all that long before we find ourselves linked up with our fellows elsewhere—creatures living beside another star out in that vast emptiness which spawns planets, suns, and minds.

For years I have thought that those organizations which spend millions of dollars on 'peace' and attempts to find out what is wrong with human nature that it should indulge in so perverse a thing as conflict, would be better advised to donate their entire treasures to the space programmes, and to astronomical research. Instead of seminars for peace research we should build more telescopes. The answer to the question 'Is mankind perverse?' will be known when we can compare ourselves with other intelligent species and evaluate ourselves according to some scale other than one which we fabricate out of the air. At the moment we are shadow-boxing, chasing phantoms. The answers lie out there somewhere with other stars and other races of beings. We can only compound our neuroses by becoming even more introspective and narcissistic. We must look outward. At the same time, of course, we must look back relentlessly into our own past. To go forward with no conception of where we have been makes no sense whatsoever. There is also the probability that we may discover mysteries about our own origins. For instance, one result of my research, which began harmlessly with an African tribe, has been to demonstrate the possibility that civilization as we know it was an importation from another star in the first place. The linked cultures of Egypt and Sumer in the Mediterranean area simply came out of nowhere. That is not to say that there were no people alive before that. We know there were lots of people, but we have found no traces of civilization. And people and civilization are vastly different things. Take for instance these words by the late Professor W. B. Emery from his book *Archaic Egypt*:

At a period approximately 3400 years before Christ, a great change took place in Egypt, and the country passed rapidly from a state of advanced neolithic culture with a complex tribal character to two well-organized monarchies, one comprising the Delta area and the other the Nile valley proper. At the same time the art of writing appears, monumental architecture and the arts and crafts developed to an astonishing degree, and all the evidence points to the existence of a well-organized and even luxurious civilization. All this was achieved within a comparatively short period of time, for there appears to be little or no background to these fundamental developments in writing and architecture.

Now, whether or not one supposes that there was an invasion of advanced people into Egypt who brought their culture with them, the fact remains that when we get back to that period of history we are faced with so many imponderables that we can hardly say anything for certain. What we do know is that primitive people suddenly found themselves living in thriving and opulent civilizations and it all happened rather abruptly. In the light of the evidence connected with the Sirius question, as well as other evidence which has either been dealt with by other authors or remains to be tackled in the future, it must be entertained as a serious possibility that civilization on this planet owes something to a visit by advanced extraterrestrial beings. It is not necessary to postulate flying saucers, or even gods in space suits. My own feeling is that this

## WHAT IS THE MYSTERY?

7

matter has not been dealt with in a sophisticated enough manner so far. But rather than enter into mere speculation as to what extraterrestrials landed in, etc., let us move on to the evidence that at least indicates that they might have been here. In Part Three we shall consider some details and clues that the extraterrestrial visitors from Sirius, whom I postulate, may have been amphibious creatures with the need to live in a watery environment. But all this gets into the speculative areas which are such treacherous ground. It has always been my policy, as well as my temperamental inclination, to stick to solid facts. We shall see as we proceed just how solid the facts are, and that is a strange enough tale for the moment. As usual, truth has proved itself stranger than fiction. The reader is advised to read Part III of this book for some 'wild speculation'.

The book which now follows poses a question. It does not present, but merely suggests, an answer. In Part One the question is posed in its original form, and in Part Two it is rephrased. But nowhere is it answered with any certainty. The best questions are the ones which often remain unanswered for a long time and lead us down new avenues of thought and experience. Who knows where the Sirius mystery will lead us in the end? But let us follow it for a while. At the very least it will be an adventure.

## Notes

1 African Worlds, ed by Daryl Forde, Oxford University Press, 1954, pp 83-110 I wish to point out to the reader that in the article in African Worlds, the French word arche is mis-translated arch and should instead be rendered ark'

2. The translation was, it turned out, extremely mept The article has been entirely retranslated by a professional translator for inclusion in this book It has also been vetted by Mme Germaine Dieterlen herself, who has kindly given permission for the publication in English of the entire article written by herself and Marcel Griaule It is to be found just after Chapter One

3 Photographs of these four tribal priests are reproduced in Plate 2 I thought it particularly important that these original native informants be seen by the reader Apart from the fact that their faces are extremely interesting, we owe these four people a great deal Without them the public at large might never have known anything about the Sirius mystery, and the entire tradition might, after its thousands of years on earth, actually have sunk without trace

## The Knowledge of the Dogon

If you look up at the sky, the brightest star you can see is Sirius. Venus and Jupiter are often brighter but they are not stars, they are planets going round our own sun, which is a star itself Now no astronomer will tell you there is any particular reason for intelligent life to be in the area of Sirius The reason Sirius is so bright is that it is large and close, bigger than the sun and bigger than the handful of other nearby stars But an intelligent astronomer will tell you that perhaps the stars Tau Ceti or Epsilon Eridani, which are rather similar to our sun, have planets with intelligent life It would be a good guess But among the stars most frequently discussed as possibly harbouring intelligent life, Sirius is not included It is not a particularly 'obvious' choice

Project Ozma in the spring of 1960, and, in more recent years, other radio searches for intelligent life in space, listened for meaningful signals from the stars Tau Ceti and Epsilon Eridani But none were detected Not that that proves anything but that these two nearby stars were thought by some sensible astronomers to be possible locations of intelligent life in our neighbourhood of space 1 Project Ozma only listened to these two stars to see if any signals were coming from them on a certain wavelength at a certain time with a lot of energy behind them Nothing happened Later such attempts have more realistically widened their scope somewhat, but the astronomers are fully aware that they are waltzing in the dark, and their efforts really take on the nature of a gesture which can only be described as bravado in the face of enormous odds They cannot be certain that they are going about the task in the right way, but are doing what they hope is their best Since Project Ozma, the giant radio telescope at Arecibo in Puerto Rico, which is the largest in the world, has listened selectively to several stars but not to Sirius It is the author's hope that the evidence presented in this book will be sufficient to stimulate an astronomical investigation of the Sirius system more thorough than all those to date, and build on the recent studies by Irving Lindenblad 2 I also believe that a programme should be instituted at a major radio telescope to listen to the Sirius system for

indications of any possible intelligent signals

Now the basis of speculations about intelligent life in space is always going to include the possibility that contact with life on our planet has already been made by some more highly evolved society from elsewhere in the universe.<sup>3</sup> It is the possibility that our planet has had contact with a culture apparently from the area of Sirius that this book will discuss. There seems to be substantial evidence that at some relatively recent time in the past – possibly between

1.2

## THE SIRIUS MYSTERY

seven and ten thousand years ago – this may have happened, and any other interpretation of the evidence would not seem to make enough sense.

Before we come to the evidence, I should say a little more about Sirius. About the middle of the last century an astronomer was looking rather hard at Sirius over a period of time and got annoyed because it wasn't sitting still.<sup>4</sup> It was wobbling. He had a difficult time figuring this out, but he finally concluded that an extremely heavy and massive star going around Sirius could make it wobble that way. The only trouble was that there wasn't any large star going around Sirius! Instead there turned out to be a tiny little thing going around it every fifty years, and so Sirius came to be called Sirius A and the little thing became Sirius B.

Sirius B was at that time unique in the universe as far as anyone knew. Over a hundred of these things have now been actually seen scattered around the sky and there are many thousands more which we cannot see even through our modern telescopes because they are so tiny and their light so feeble. They are called white dwarfs.<sup>5</sup>

White dwarfs are strange because although they are feeble they are strong. They do not give out much light, but they are fantastically powerful gravitationally. On a white dwarf we would not even be a fraction of an inch high. We would be flat, pulled in by the gravity. \* You see, the 'big' star that was necessary to make Sirius A wobble turned out to be a little thing, but it still had to be as massive and heavy as an ordinary star of much more enormous size. It is, in short, a star so dense and closely packed that it is not even made out of regular matter. It is made out of what is called 'degenerate' matter or 'super-dense' matter, where the atoms are pressed together and the electrons squashed. This matter is so heavy that it cannot be thought of in any familiar terms. There is nothing in our solar system, to our knowledge, comparable to this stuff. But physicists have considered it theoretically, and in this century we are making some progress towards understanding it.

It is even claimed by some astronomers that the Sirius system has a Sirius C, or a third star. Fox claimed to see it in 1920, and in 1926, 1928, and 1929 it was supposedly seen by van den Bos, Finsen, and others at the Union Observatory. But then for several years when it should have been seen, it was not. Zagar and Volet said it was there because there were wobbles that pointed to it. So perhaps it's there and perhaps it isn't.<sup>6</sup>

The most recent full study of the Sirius system by an astronomer has been carried out by Irving W. Lindenblad of the U.S. Naval Observatory in Washington, D.C. He and I have corresponded, and he has sent me his publications (the latest appeared in 1973) and also the photograph in Plate 1, which was taken by him in 1970 after several years' preparation and is the first photograph ever taken of the star Sirius B, which in the photograph is a tiny spot of light near the main star Sirius A, which is 10,000 times brighter.

Lindenblad's accomplishment in getting a successful photograph is described in Notes to the Plates. He has studied the Sirius system for seven years and has

\* A cubic foot of the matter of Sirius B would weigh 2,000 tons. A match box full of matter from the star would weigh a ton and a quarter. But a match box full taken from the star's core would weigh approximately 50 tons. The star is 65,000 times denser than water, whereas our own Sun has a density about equal to that of water.

## THE KNOWLEDGE OF THE DOGON

13

found no evidence of a third star, Sirius C. He says:<sup>7</sup> "There is no astrometric evidence, therefore, of a close companion to either Sirius A or Sirius B." At the moment, as this book goes to press, a study of Sirius B is being carried out by Dr. Paul G. Mardín of the Royal Greenwich Observatory, who is trying to measure the light from the tiny star. He had still had no success by early 1974 when he and I entered into correspondence. Mardín has informed me that another astronomer, D. Lauterborn, believes there is a third star in the Sirius system.<sup>8</sup> Mardín adds: "Whether the unseen companion of A is the same star C in Aitken's<sup>9</sup> I cannot say (from a letter to me of 12 February 1974). Lindenblad's evidence is conclusive as far as it goes, but it is not at all clear that no Sirius C exists. This is an interesting point for further study and may require observations of longer than Lindenblad's seven years (which were taking place during the seven years I was preparing this book). As Lindenblad has written to me: 'Like Jacob's service for Rachel, the mysteries of Sirius appear to require seven years of labour: then we hope not to have received Leah!' But as, so like Jacob, the seven years may be just a prelude.

Now we see that the Sirius system is rather interesting and complicated. Only in this century have we advanced towards knowing about degenerate matter and understanding white dwarfs through our researches into nuclear physics. So we would be surprised, would we not, if someone without our modern science had known as much about the Sirius system as we do?

At this point I want to quote from an interesting book entitled *Intelligent Life in the Universe* by two eminent astronomers, Carl Sagan, of Cornell and formerly of the Smithsonian Astrophysical Observatory, and I. S. Shklovskii of the Soviet Academy of Science (Sagan saw a book by Shklovskii and extensively rewrote it in English, and thus is the book referred to.) In a very sensible chapter called *Possible Consequences of Direct Contact* Sagan says 10

[Matters of human evolution], while difficult for us to reconstruct from a distance of millions of years, would have been much clearer to a technical civilization greatly in advance of the present one on Earth, which visited us every hundred thousand years or so to see if anything of interest was happening lately. Some 25 million years ago, a Galactic survey ship on a routine visit to the third planet of a relatively common G dwarf star [our Sun] may have noted an interesting and promising evolutionary development. Proconsul [the ancestor of homo sapiens, or modern man]. The information would have filtered at the speed of light slowly through the Galaxy, and a notation would have been made in some central information repository, perhaps at the Galactic center. If the emergence of intelligent life on a planet is of general scientific or other interest to the Galactic civilizations, it is reasonable that with the emergence of Proconsul, the rate of sampling of our planet should have increased, perhaps to once every ten thousand years. At the beginning of the most recent post-glacial epoch, the development of social structure, art, religion, and elementary technical skills should have increased the contact still further. But if the interval between sampling is only several thousand years, there is then a possibility that contact with an extraterrestrial civilization has occurred within historical times.

This is a very interesting prelude to our own story, and I believe Sagan and Shklovskii's attitude is broadly true of the entire astronomical profession. I have certainly never met an astronomer of today who seriously doubted that there must be countless numbers of intelligent civilizations scattered throughout the universe on other planets which are orbiting around other stars. 11 Any people who still believe human beings are unique as intelligent life in the universe are seriously out of touch with reliable and informed estimates by scientists and astronomers. An attitude which asserts that man is the only intelligent life form in the universe is intolerably arrogant today, though as little as twenty years ago it was probably common belief. But anyone who holds such an opinion today is, fortunately for those who like to see some progress in human conceptions, something of an intellectual freak equivalent to a believer in the Flat Earth Theory. I mention that theory because I once met a woman who appeared quite sane and yet who was a member of a cult who believe the Earth is flat. This was one of the more startling experiences anyone can have, and a salutary education to me. It taught me never to underestimate the power of the human mind to believe what it wants to believe despite any amount of evidence.

Dr Melvin Calvin, of the Department of Chemistry University of California at Berkeley, has said: 'There are at least 100,000,000 planets in the visible universe which were, or are, very much like the earth. This would mean certainly that we are not alone in the universe. Since man's existence on the earth occupies but an instant of cosmic time, surely intelligent life has progressed far beyond our level on some of these 100,000,000 planets.'<sup>12</sup>

Dr Su-Shu Hwang of the Goddard Space Flight Center, Maryland, has written: 'Planets are formed around the main sequence stars of spectral types later than F5. Thus, planets are formed just where life has the highest chance to flourish. Based on this view we can predict that nearly all single stars of the main sequence below F5 and perhaps above K5 have a fair chance of supporting life on their planets. Since they compose a few per cent of all stars, life should indeed be a common phenomenon in the universe.'<sup>13</sup>

Dr A. G. W. Cameron, Professor of Astronomy at Yeshiva University, has discussed the stars Tau Ceti and Epsilon Eridani, which are considered the two likeliest localities for intelligent life within our immediate neighbourhood of space (within five parsecs of us, a parsec being an astronomical unit of distance). He has then said, however: 'But there are about 26 other single stars of smaller mass within this distance, each of which should have a comparable probability of having a life-supporting planet according to the present analysis.'<sup>14</sup>

Dr R. N. Bracewell of the Radio Astronomy Institute, Stanford University, has said:<sup>15</sup>

As there are about one billion stars in our galaxy, the number of planets would be about 10 billion. Now not all of these would be habitable, some would be too hot and some too cold, depending on their distance from their central star, so that on the whole we need only pay attention to planets situated as our earth is with respect to the sun. Let's describe such a situation as being within the habitable zone.

This is not to imply that no life would be found outside the habitable zone. There may very well be living things existing under most arduous

## THE KNOWLEDGE OF THE DOGON

physical conditions. After elimination of frozen planets and planets sterilized by heat, we estimate that there are about  $10^{10}$  [ten thousand

million] likely planets in the galaxy [for life]

Of the  $10^{10}$  likely

planets, we frankly do not know how many of them support intelligent life. Therefore, we explore all possibilities, beginning with the possibility

that intelligent life is abundant and in fact occurs on practically every planet. In this case, the average distance from one intelligent community to the next is 10 light years. For comparison, the nearest star, of any kind, is about 1 light year away.

Ten light years is a very large distance. A radio signal would take 10 years to cover the distance. . . . Consequently, communicating with someone 10 light years away would not be like a telephone conversation. . . . are we sure that we can send a radio signal as far as 10 light years? A definite answer can be given to this question.

There is no need for me to continue marshaling quotations from distinguished scientists and astronomers in support of the possibility of intelligent life in space, as the situation is by now obvious. The odds against intelligent life occurring fairly frequently within our galaxy are impossible ones. Since this is established, we are faced with yet another factor: in our own history, technological development has been rapid within a short space of time. When civilizations all over the universe reach 'take-off point' they have a technological explosion. It is familiar to older members of our species today that when they were young there were no airplanes, automobiles, rockets, satellites, electricity, radio, or atom bombs. People were dying of diseases which today we do not take seriously, no one with a toothache could obtain modern dental treatment, the concept of elementary hygiene was a novelty. I am not reciting all these wonders merely as a ritual incantation to our new god of progress. The point to be grasped is the sudden combustible nature of progress of this kind. In the lifetime of a single person all this can come about.

'Take-off point' is probably a universal phenomenon. Intelligent societies all over the universe will probably have experienced it, or are due to. Now the lifetime of a single person is of no consequence on the great universal time scale for the development of civilizations, not to mention the formation of planets. Therefore any society in advance of our own is certain to be very much in advance of ours. Once intelligent societies reach take-off point, they rush so quickly upward in technological competence that a comparison between them and non-technological societies is almost absurd. It would be foolish for us to suppose that any society more advanced than ours would be just a few years ahead of us. It would more likely be just a few tens of thousands of years ahead of us. And the technology and nature of such a society are beyond our abilities to imagine. The intelligent societies existing in the universe, then, are going to be of two kinds: 'less advanced than ourselves, primitive' and 'fantastically more advanced than ourselves, magical'. To be at the point where we are now, at the watershed between 'primitive' and 'magical', is such a rare event in the universal history, that we may be the only intelligent society in the entire galaxy which is at this moment experiencing such a stage in our evolution. We therefore should feel privileged to be witnesses of it. Of course, the nature



## THE SIRIUS MYSTERY

of time comes in again with the impossibility of talking sensibly about simultaneity in the galaxy at all. But that is another subject, and one which we may ignore here.

A further thought follows upon the above observations. Granted that there are two forms of society in the universe aside from our own bizarre transition stage, the 'primitive' societies are obviously only of interest to those more advanced than themselves, for they are incapable of communicating with anybody else. They are like we were as little as a hundred years ago: provincial, quiet, probably quite murderous, and smug, with the occasional visionary who is burned at the stake or crucified causing a moral ripple. But they cannot send or receive messages between the stars. In our transition stage, aptly enough, we can receive such messages with existing equipment, but could not send any unless we constructed expensive and special means to do so. Now that means that the only societies carrying on an interstellar dialogue of any kind are the 'magical' societies. These societies will be so advanced that they probably have emerging primitives like ourselves 'taped'. They certainly have standard sets of procedures for dealing with the likes of us, and may already have commenced their operations with the long-range intent of bringing us into their club. But just as no London gentlemen's club wishes to have a savage in a g-string waving his spear and poisoned arrows about in the members' lounge, so the interstellar club is unlikely to plug us straight into the circuits as a fully fledged member.

But what I am getting at is not merely to impress upon the reader that a pecking order is likely to exist in the interstellar club of any galaxy—at least to the extent of having restrictions on novices, but to make the point which emerges from this. And the point is, that such highly advanced societies have possibly developed to such a pitch of technological expertise that interstellar travel has become possible for them, whereby they can physically transport themselves over at least modest interstellar distances of a few light years to their near neighbours. And if that is the case, then our own planet, which any half-witted extraterrestrial astronomer in the neighbourhood could assume as a likely place for life to exist, has almost certainly been physically visited by extraterrestrials in their travels. This could have happened at any time in our lengthy history as a planet. No doubt, at the very least, our distant ancestors the cave-men would have been observed by extraterrestrial probes, who would have made a note that something was happening on this planet—slowly happening, but nevertheless actually happening. And as Sagan and Shklovskii said in the quotation from their book: 'It is reasonable that the rate of sampling of our planet should have increased, perhaps to once every ten thousand years. But if the interval between sampling is only several thousand years, there is then a possibility that contact with an extra-terrestrial civilization has occurred within historical times' 16

If this were so, it would certainly have left some impact upon man and

been incorporated somehow into his traditions. But if several thousand years had elapsed between that time and the present, the traces of the impact on man's culture would have been mostly dissipated and, it would seem, nearly impossible to elucidate. Unless some specific and unmistakable survivals were found to exist, in circumstances which would probably be unusual, it

## THE KNOWLEDGE OF THE DOGON

17

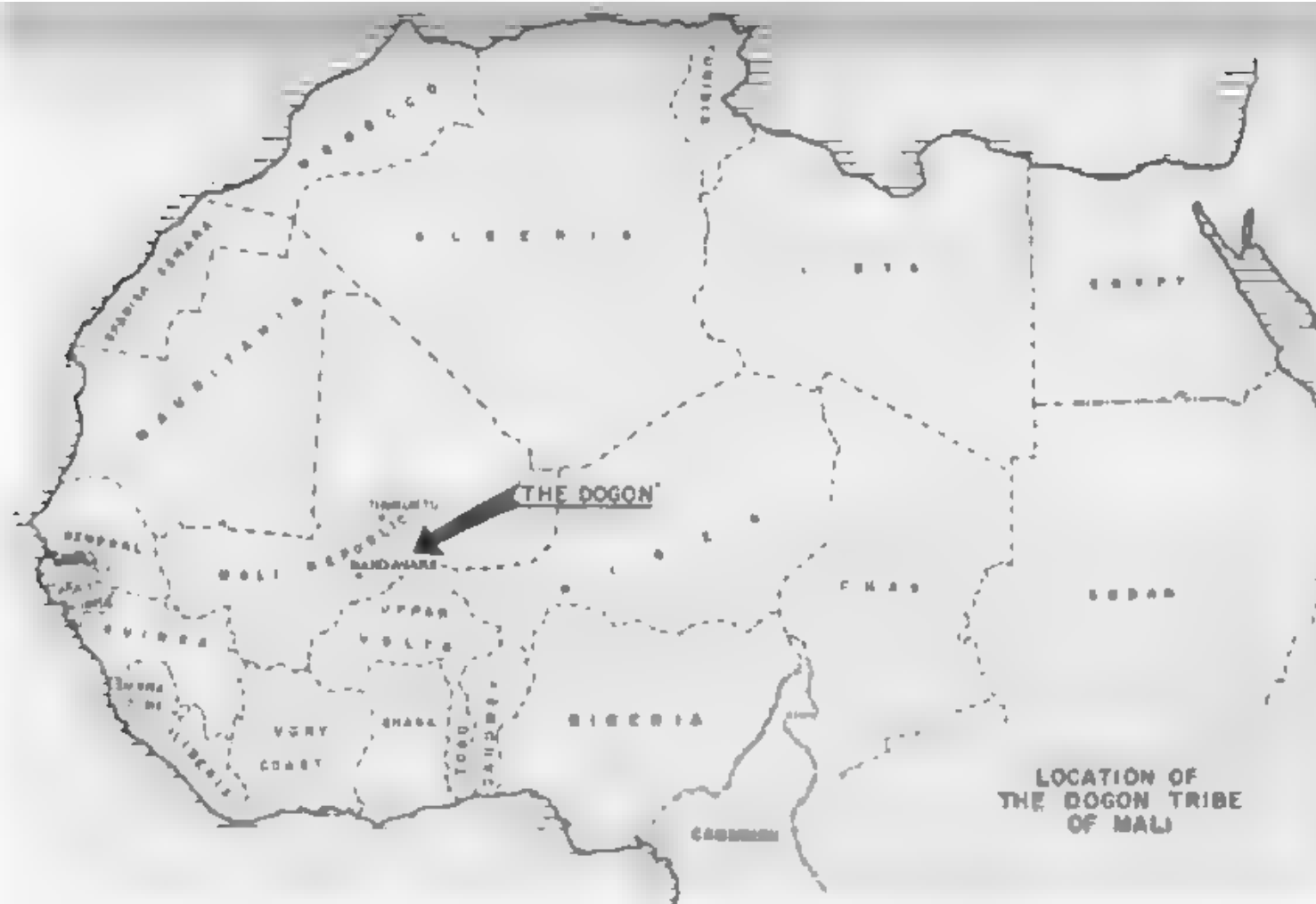
seems that the hope of reconstructing scattered clues and fragments of the original tradition would be futile. That there would be something there if you could find the key seems certain. Let us return to a continuation of that passage from Sagan and Shklovski for suggestions as to how a memory of an extraterrestrial contact might have been preserved from prehistoric or early historic times on Earth, through comparison with a verifiable story of French contact made with certain American Indians in 1786, as it was told to a modern anthropologist in the form of a tribal myth. 17

There are no reliable reports of direct contact with an extraterrestrial civilization during the last few centuries, when critical scholarship and non-superstitious reasoning have been fairly widespread. Any earlier contact story must be encumbered with some degree of fanciful embellishment, due simply to the views prevailing at the time of the contact. The extent to which subsequent variation and embellishment alters the basic fabric of the account varies with time and circumstance. [An example] relevant to the topic at hand is the native account of the first contact with the Tlingit people of the northeast coast of North America with European civilization: an expedition led by the French navigator La Perouse, in 1786. The Tlingit kept no written records. One century after the contact, the verbal narrative of the encounter was related to the American anthropologist G. T. Emmons by a principal Tlingit chief. The story was overlaid with the mythological framework in which the French sailing vessels were initially interpreted. But what is very striking is that the true nature of the encounter had been faithfully preserved. One blind old warrior had mastered his fears at the time of the encounter, had boarded one of the French ships, and exchanged goods with the Europeans. Despite his blindness, he reasoned that the occupants of the vessels were men. His interpretation led to active trade between the expedition of La Perouse and the Tlingit. The oral rendition contained sufficient information for later reconstruction of the true nature of the encounter, although many of the incidents were disguised in a mythological framework. For example, the ships were described as immense black birds with white wings.

As another example, the people of sub-Saharan Africa, who had no written language until the colonial period, preserved their history primarily through folklore. Such legends and myths, handed down by illiterate people from generation to generation, are in general of great historical value.

I don't know why the people of sub-Saharan Africa — with whom our intuitive evidence deals — are mentioned at this point in the Sagan book, for they do not

crop up again in this chapter and it is something of a coincidence that they are mentioned out of the blue like this. Sagan goes on to discuss some fascinating creatures credited with founding the Sumerian civilization (which sprang up out of nowhere, as many Sumerian archaeologists will unhappily admit) they are described in a classical account by Alexander Polyhistor as amphibians. He says they were happier if they could go back to the sea at night and return to dry land in the daytime. All the accounts describe them as being semi-demons, personages, or animals endowed with reason, but (they are never



called gods. They were 'superhuman' in knowledge and length of life and they eventually returned in a ship 'to the gods' carrying with them representatives of the fauna of the earth. I discuss these traditions particularly in Chapter Eight, and the surviving accounts of them are to be found in Appendix II, reprinted here in their entirety for the first time since 1876.

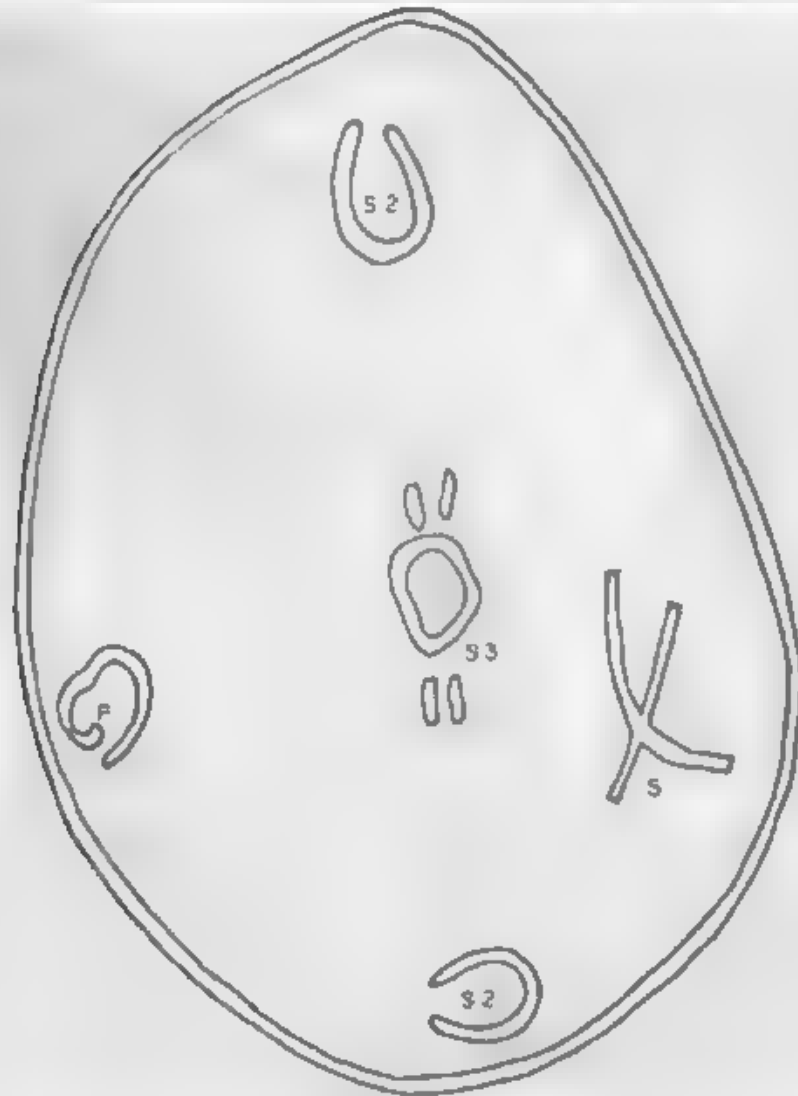
The Sumerian culture is very important. We shall be discussing it later in this book. It formed the original basis of that Mesopotamian civilization which is better known to most people through the much later Babylonians and Assyrians who inherited much of the Sumerian culture. The actual language of the Sumerians was superseded rather early by the Akkadian language (which is Semitic; Sumerian is non-Semitic and seems to have no linguistic affinities at all). The Akkadians and the Sumerians intermingled and eventually formed a meld like that which now exists between what once were the separate Normans and Anglo-Saxons in Britain, except that the Akkadians were Semitic and the Sumerians were not, and with considerable physical differences between them. Then the city of Babylon with its Babylonians and the region of Assyria with its Assyrian warriors to the north—and later the distant region of Persia with its Persians to the east—commanded the Mesopotamian area. From the Sumerian-Akkadian milieu also evolved those Semites known as Hebrews or Jews.

It should be more widely realized that when those famous Biblical figures Noah and Abraham 'lived' there was no such thing as a Hebrew yet in existence. Indeed, Noah is merely a Hebrew name for a much more ancient flood hero discussed in ancient texts which we have now recovered from early Sumer. It is these Sumerians to whom Sagan has just referred, with their legend of an amphibious creature who founded their civilization. But all this does not concern us quite yet. I will just add that the Jews and the Arabs are both traditionally said to be descendants of Abraham, and Abraham was neither a Jew nor an Arab.

Now the peoples of sub-Saharan Africa are the source of our first arresting information. The particular people are called the Dogon, and they live in the present state of Mali. The nearest cities to them are Timbuctoo, Bamako, and Ouagadougou in Upper Volta. Initial research by me on the Dogon turned up an article in an anthropological journal by the French anthropologists Marcel Griaule and Germaine Dieterlen.<sup>19</sup> The article was written in French and an English translation of it is published, for the first time, as sequel to Part One of this book. I decided to publish the article in full because of the difficulty most interested readers would find in locating the French journal in which the original article appeared. And, of course, the original article could only be

read by those who know French. The complete article, with its footnotes and all its illustrations, and in English, is therefore available for anyone who wishes to read it for himself. It is thus not necessary for me to summarise its contents.

When I first read the article, which is entitled 'A Sudanese Sirius System' (and refers to the French Sudan area, not the Republic of Sudan over a thousand miles to the east below Egypt), I could hardly believe what I saw. For here was an anthropological report of four tribes, the Dogon and three related ones, who held as their most secret religious tradition a body of knowledge concerning



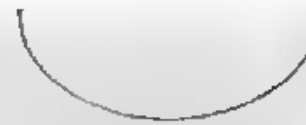
KEY: S = SIRIUS

52 \* POSITIONS OF SIRIUS B

53 \* ANOTHER STAR

P \* A PLANET

Figure 2



AN ELLIPSE

Figure 3

## THE KNOWLEDGE OF THE DOGON

21

trally invisible', whereas we know it is totally invisible except through a powerful telescope. What, then, is the answer?

Griaule and Dieterlen make clear that the large and bright star of Sirius is not as important to the Dogon as the tiny Sirius B, which the Dogon call *po tolo* (*tolo* meaning 'star'). *Po* is a cereal grain commonly called 'fonio' in West Africa, and whose official botanical name is *Digitaria exilis*. In speaking of the *po* star, Griaule and Dieterlen call it the star *Digitaria*—or just simply 'Digitaria'. What is significant about the *po* grain is that it is the smallest grain known to the Dogon, being extremely minute, and unknown as food in Europe or America. To the Dogon, this tiny grain represents the tiny star, and that is why the star is called *po*, after the grain.

In the article we read 'Sirius, however, is not the basis of the system: it is one of the foci of the orbit of a tiny star called Digitaria, *po tolo*—which hogs the attention of male initiates.' Now, this is a most unsettling statement. The casual reader may not notice just how unusual it is for an African tribe to put it quite this way. But the orbit of Digitaria, which the Dogon elsewhere describe as egg-shaped or elliptical (see also Figures 6 and 7, as well as the illustrations to the article), is specifically described as having the main star Sirius as 'one of the foci of [its] orbit'. Of course, the technical term 'focus' has here been supplied by the anthropologists. But they were faithfully rendering the meaning of what the Dogon said in their own language. And what the Dogon were saying, and which they also make quite clear graphically in their drawings (see Figures 2 and 6), is that the orbit of Sirius B around Sirius A is of a kind which obeys one of Kepler's laws of planetary motion, extended to other orbiting bodies. It was Johannes Kepler (1571–1630) who first proposed that heavenly bodies do not move in perfect circular paths. He hit upon the brilliant insight that the planets in their motions around the sun were moving in elliptically shaped orbits, with the sun at one of the two foci of each ellipse. Most people I speak to have no idea that the planets don't go in circles around the sun. Even if they were taught the truth at school, they have long since forgotten about things like that. And many people honestly don't know what an ellipse is unless you show them one.

An ellipse is a kind of 'stretched' circle. You can conceive of grabbing the centre of a circle and ripping the centre into two pieces, and then pulling those two portions away from each other. This would naturally make the circle

flatten at the top and the bottom and bulge at the two sides, and the two pieces of the centre would fall along a straight line joining the two most distant points. These two fragments of centre each then have the name of focus, and the two

the system of the star Sirius, including specific information about that star system which it should be impossible for any primitive tribe to know

The Dogon consider that the most important star in the sky is Sirius B which cannot be seen. They admit that it is invisible. How, then, do they know it exists? Griaule and Dieterlen say 'The problem of knowing how, with no instruments at their disposal, men could know the movements and certain characteristics of virtually invisible stars has not been settled, nor even posed'. But even in saying this, Griaule and Dieterlen imply that Sirius B is only 'vir-



CIRCLE, ONE CENTRE



ELLIPSE, TWO FOCI

*Figure 4*

together are 'the foci of the ellipse'. If you could get your hands on that ellipse and push at the bulging ends, you might force it back together again and make it a proper circle.

But what I ask all readers to take note of is this. How did the Dogon tribe, who had no access to the theories of Kepler or his successors, know about matters like this? How did they even get the idea in the first place that elliptical orbits existed, rather than circular? Much less apply this idea to some invisible star way out in space? And also to get it right by saying that Sirius A was at one of the foci, rather than just somewhere in the ellipse? And not at the centre? Wouldn't the natural, primitive idea seem to be, even if you wanted to say the orbit was elliptical, still to have Sirius itself at the centre? But no. They knew too much to make a mistake like that. For the whole point about Kepler's Law is that not only are the orbits ellipses, but the sun must always be at one of the foci; otherwise nothing will work. Now, in order to know about all this, you need not have had Kepler. Elliptical orbits are a universal truth, as true here as they are on the other side of the galaxy, or even in some other galaxy. Kepler merely discovered a natural principle. He didn't invent it. So there was no need for the Dogon to know about Kepler personally. All that is required is an ex-

planation of how they could have learned the universal principle from any other source, considering that they exist on this planet, and we don't know of anyone else on this planet, living in Africa, say, who has discovered any of these things

In Fig. 6, I compare the Dogon drawings of the orbit of Sirius B around

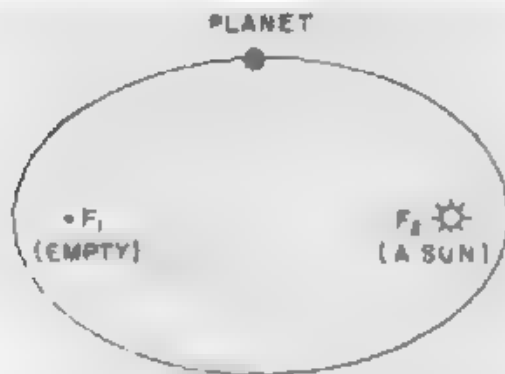


Figure 5



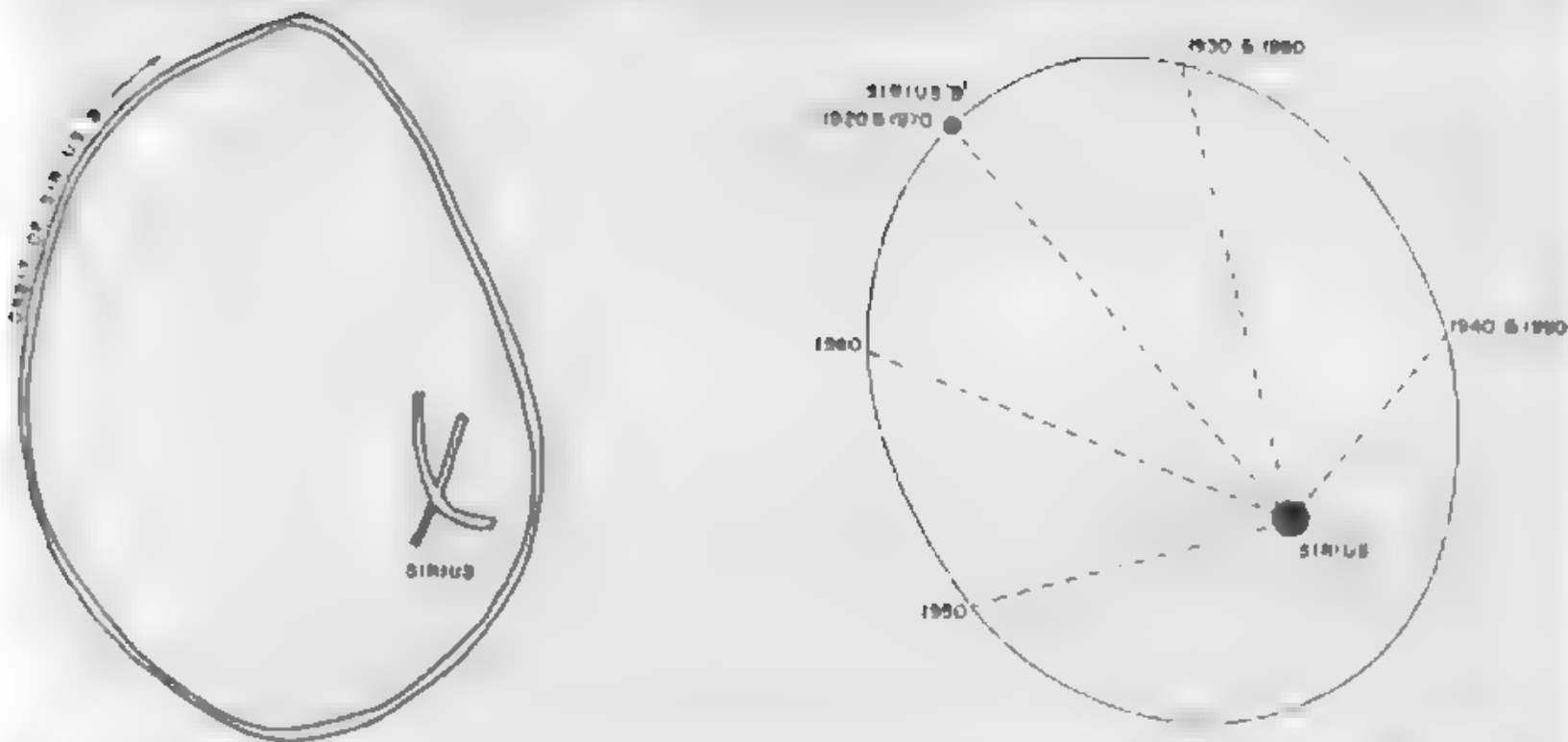


Figure 6. On left, the orbit of Dogtania /Sirius B) around Sirius as portrayed by the Dogon in their sand drawings. On right, A modern astronomical diagram of the orbit of Sirius, the years indicated being the positions of Sirius B in its orbit on those dates. Note that the Dogon do not place Sirius at the centre of their drawing but seem to place it near one focus of their approximate ellipse – which constitutes one of the most extraordinary features of their information, and matches the diagram on the right to an uncanny degree.

Sirius with the modern astronomical diagrams of the same (which have just been confirmed as accurate at this scale by Lindenblad's latest work), also there is a comparison of the same information, tribal and modern, as seen in a linear perspective, stretched through time. I do not need to claim any perfect scientific accuracy for the Dogon drawings. The similarity is so striking that the most untrained eye can immediately see that the general picture is identical in each instance. There is no need for perfectionists to get out their slide rules or measuring tapes. The fact is demonstrated, and it is that the Dogon have an accurate general knowledge of the most unobvious and subtle principles of the orbiting of Sirius B around Sirius A.

The Dogon also know the actual orbital period of this invisible star, which

is fifty years. Referring to the sacred Sigui ceremony of the tribe, Dieterlen and Griaule tell us: "The period of the orbit is counted double, that is, one hundred years, because the Siguis are convened in pairs of "twins", so as to insist on the principle of twin-ness".

The Dogon also say that Sirius B rotates on its axis, demonstrating that they know a star can do such a thing. In reality, all stars really do rotate on their axes. How do the Dogon know such an extraordinary fact? In the article, the Dogon are recorded as saying: "As well as its movement in space, Digitaria also revolves upon itself over the period of one year and this revolution is honoured during the celebration of the bado rite". It is not known to modern astronomy what the period of rotation of Sirius B is: the star is so small, we think we are doing well to see it at all. I asked one astronomer, G. Wegner, of Oxford's Department of Astrophysics and the University Observatory, whether one year might be a sensible estimate of the rotation period of Sirius B. He naturally replied that we had no way of determining it, but that a year could be right: in other words, it cannot be ruled out, which was all I was seeking to establish.

The Dogon describe Sirius B as "the infinitely tiny". As we know, Sirius B is a white dwarf and the tiniest form of visible star in the universe. But what is really the most amazing of all the Dogon statements is this: "The star which is considered to be the smallest thing in the sky is also the heaviest. "Digitaria is the smallest thing there is. It is the heaviest star." It consists of a metal called sagala which is a little brighter than iron and so heavy "that all earthly beings combined cannot lift it". In effect the star weighs the equivalent of "all the seeds, or of all the iron on the earth" (all this from the following article by Griaule and Dieterlen).

So we see the Dogon presenting a theory of Sirius B which fits all known scientific facts, and even some which are not known: it presents as well. They know that the star is invisible, but they know it is there nevertheless. They know that the star's orbital period is fifty years, which it really is. They know that Sirius A is not at the centre of its orbit, which it is not. They know that Sirius A is at one of the foci of Sirius B's elliptical orbit, which it is. They know that Sirius B is the smallest kind of star, which it is (barring totally invisible collapsing neutron stars). They know that Sirius B is composed of a special kind of material which is called sagala, from a root meaning 'strong' and that this material does not exist on the earth. They know that this material is heavier than all the iron on earth, etc., all of which is perfectly true. For

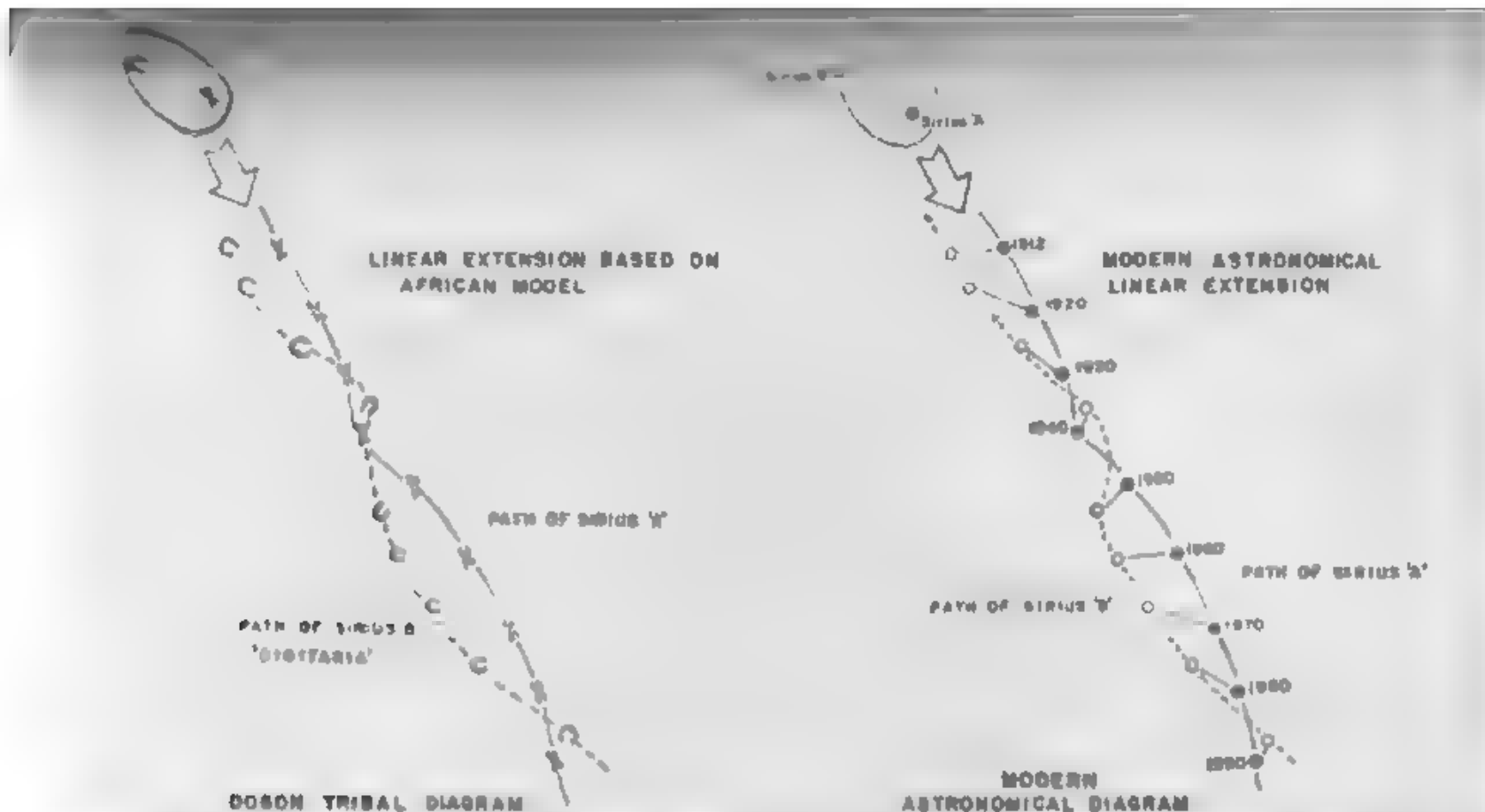


Figure 7. The linear extension on the right is scientifically reliable, based on measurements of the rate of revolution of Sirius B around Sirius A. The linear extension on the left is not scientifically reliable. It is a presumed correlation, for there is no way in which the rate of revolution of Dotstaria can be known certainly from the Dogon information. These linear extensions cannot, therefore, be considered to constitute hard evidence of a correlation. It is likely, though, that they do correlate because Dotstaria is presumed to move at a rate which makes astronomical sense (for if the shape of the orbit and the distance match, the period should match).

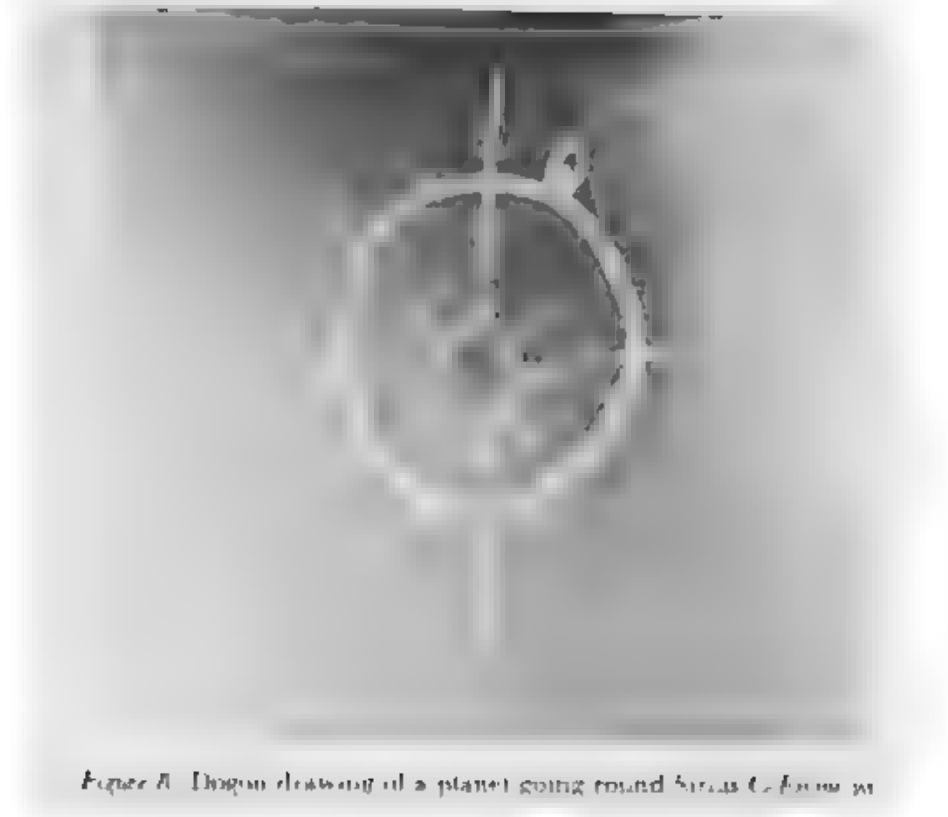


Figure A Dogon drawing of a planet going round Sirius C (Figure 1)

Sirius B is in reality made of super dense matter of a kind which exists nowhere on earth

All this forms the most sacred and most secret tradition known to the Dogon, the basis of their religion and of their lives. Connected with all this are statements they make about the existence of a third star in the Sirius system, which they call the emme ya star which, in comparing it to Digtaria, they say is 'four times as light (in weight), and travels along a greater trajectory in the same direction and in the same time as it (fifty years). Their respective positions are such that the angle of their radii is at right angles. This last star has a satellite, indicating that the Dogon appreciate that bodies other than stars are satellites of stars. Of emme ya itself, they say: 'It is the "the sun of women" . "a little sun" . In fact it is accompanied by a satellite which is called the "star of women" or Goatherd as the guide of (emmeyd) '.

Around the astronomical facts of this extraordinary system, the Dogon have a complicated system of mythology. Sirius B they see as relentlessly revolving around Sirius and never capable of reaching it. All these facts have mythological tales and personages connected with them. I have tried to

extract the bare facts from the article and present them here for the reader. But the reader will by now see quite clearly why I have included the entire article in this book, for the information is so incredible that I thought the reader would simply think I had made it all up unless I presented the source for him to read through himself.

## THE KNOWLEDGE OF THE DOGON

27

But let us move beyond the Griaule and Dieterlen article 'A Sudanese Sirius System'. Let us now consider a later and fuller publication of book length, which is obviously too bulky to include within this book as an appendix. I refer to the book *Le Renard Pale* (The Pale Fox) published in 1965. This book, by Griaule and Dieterlen, was produced ten years after the death of Marcel Griaule himself. It contains Mme Dieterlen's latest reflections on the Sirius system of the Dogon. In this definitive compendium<sup>20</sup> of much of the joint findings of herself and Marcel Griaule (it is only the first such volume of theirs to appear in a planned series summing up their work), Mme Dieterlen has actually added a brief appendix on pages 529-31 which gives information about Sirius and its companion star in the form of an extract from an article by Dr P. Baize which appeared in the September 1931 issue of *Astronomie*. She says 'The excerpts concern the discovery, orbit, period and density of the Companion of Sirius'.<sup>21</sup> Her curiosity has obviously developed since 1950 and the publication of 'A Sudanese Sirius System'. But like a true professional, Mme Dieterlen merely cites the astronomical facts in this way in a short appendix at the back of her book<sup>22</sup> without drawing any conclusions or even indicating the connection of this subject with the Dogon's traditions. In fact, lest the reader assume otherwise, I must make clear that neither Marcel Griaule nor Mme Dieterlen has at any time (to my knowledge) made any claim of extraterrestrial contact to do with the Dogon. They have not even made any direct comments on the extraordinary impossibility of the Dogon knowing all the things which they know. I could never have made discoveries such as those of Griaule and Dieterlen and merely said (as in the article), 'The problem of knowing how . . . has not been settled, nor even posed'. I do believe such restraint calls for a medal: it is so phenomenal that it is the greatest factor in favour of Griaule and Dieterlen's discoveries. If they had trumpeted their findings, I suppose I would never have taken them seriously. I would have thought them unreliable. Such are the ironies by which information can be revealed . . . by almost disappearing through diffidence.

I sat down and rewrote this book in the light of *Le Renard Pale* (I have not been able to discover whether this has been published in English; I read the translation in manuscript), with its more complete information. Much of this will be found in the context of a more advanced discussion in Chapter Eight.

In *Le Renard Pale* it is possible to learn much more of the Dogon beliefs and knowledge relating to astronomy and the Sirius system. Of the moon, they say it 'is dry and dead like dry dead blood'.<sup>23</sup> Their drawing of the planet Saturn has a ring around it, and is reproduced as Figure 10 in this book. They know that the planets revolve around the sun. Planets are called *tolo tanaze*, 'stars that turn

(around something) 24 But this does not mean turning around the Earth. The Dogon specifically say, for instance Jupiter follows Venus by turning slowly around the sun 25 The various positions of Venus are recalled on a very large geographical space by a series of altars, raised stones, or arrangements in caves or shelters 28 The positions of Venus determine a Venus calendar 27 In fact, the Dogon have four different kinds of calendar Three of them are liturgical calendars a solar calendar a Venus calendar, and a Sirius calendar their fourth is an agrarian one, and is lunar 28

The Dogon know of the existence of four other invisible heavenly bodies



Figure 9. Dogon drawing of Jupiter with its four main moons

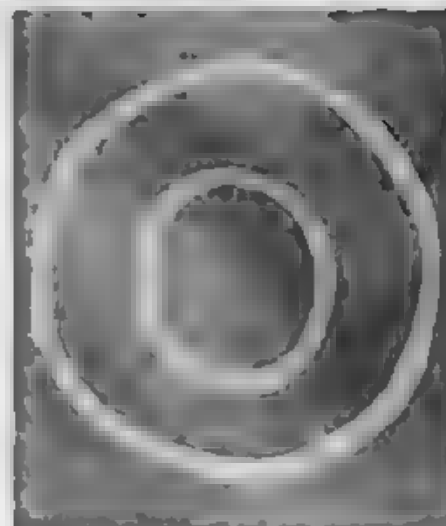


Figure 10. Saturn with its ring Dogon drawing

Sirius B and its possible companions in the Sirius system. These other four bodies are in our own solar system For the Dogon know of the four major 'Galilean' moons of Jupiter These four moons are called 'Galilean' because Galileo discovered them when he began to use the telescope The other moons of Jupiter are small and insignificant, having formerly been asteroids which were captured by Jupiter's gravitation at some unknown time in the past (They are thought to have come from the asteroid belt between Mars and Jupiter which some astronomers think once constituted a planet which exploded.) The Dogon say 'The mutilation (the Fox) suffered was still bloody The blood of his genitals fell on the ground, but Amma made it ascend to heaven as four satellites that turn around dana tolo, Jupiter. "The four little stars are Jupiter wedges" When Jupiter is represented by a rock, it is wedged in with four stones 29 A Dogon drawing of Jupiter with its four moons is reproduced in Figure 9 in this book Griaule and Dieterlen describe this drawing as follows 30

This figure represents the planet the circle surrounded by its four satellites in the collateral directions and called dana tolo unum 'children of dana tolo (Jupiter)' The four satellites, associated to the four varieties of sene (acacia), sprang from the drops of blood from the Fox's mutilated genitals 'The four small stars are Jupiter's hulls' The sectors between the satellites represent the seasons. They turn around Jupiter and their movements will favour the growth of the sene leaves, for the sene moves on the ground at night like the stars in the sky: they turn on their own axes (in a year) like the satellites.

They add in a footnote that the trunks of certain varieties of sene are spiralled. A house is not built with sene wood, which would make the house "turn". The "movements" of the sene at night are supposed to attract the souls of the dead who "change place". A

As for Saturn, drawn in Figure 10, the Dogon specifically describe its famous halo, which is only visible through a telescope. According to Griaule and Dieterlen<sup>31</sup> the Dogon affirm there is a permanent halo around the star, different from the one sometimes seen around the moon: the star is always associated to the Milky Way.

Saturn is known as<sup>32</sup> the star of limiting the place in association somehow with the Milky Way. The meaning is unclear, and the anthropologists say

the subject must be pursued further,<sup>33</sup> but it would seem they may be trying to convey the idea that Saturn 'limits the place' of the solar system, separating

it from and acting as link with, the Milky Way itself, in which the solar system is situated. Saturn being the outermost planet which the Dogon mention, this may be their intended meaning. The Dogon realize that the Milky Way contains the earth<sup>34</sup> the Milky Way is in itself the image of the spiralling stars inside the "world of spiralling stars" in which the Earth is found. In this "world of stars" the axis ("Amma's fork") around which they move, links the Polar Star and so on. The Milky Way is described as the more distant stars—that is, than the planets.

We are told that<sup>35</sup> For the Dogon an infinite number of stars and spiralling worlds exist. They carefully differentiate the three kinds of tolo or 'stars': "The fixed stars are a part of the "family of stars that doesn't turn" (around another star) the planets belong to the "family of stars that turns" (around another star) the satellites are called tolo gonoze "stars that make the circle".<sup>36</sup> The heavenly motions are likened to the circulation of the blood. The planets and satellites and companions are 'circulating blood'.<sup>37</sup> And this brings us to the extraordinary point that the Dogon do know about the circulation of the blood in the body from their own tradition. In our own culture, the Englishman William Harvey (1578—1657) discovered the circulation of the blood. Strange as it may seem to us now, before his time the notion seems not to have occurred to anyone. John Aubrey, author of *Brief Lives*, knew Harvey well, and tells us<sup>38</sup> 'I have heard him say, that after his Booke of the Circulation of the Blood came

out, that 'twas believed by the vulgar that he was crack-brained ' .  
 However the same theory does not seem to arouse among the Dogon notions  
 that their wise men are crack-brained. Here is an account of the theory by the  
 Dogon themselves and recorded in their own words 39

The movement of the blood in the body which circulates inside the organs in  
 the belly, on the one hand 'clear' blood, and on the other the oil, keeps them  
 both united (the words in man) that is the progress of the word. The blood-  
 water 'or clear' goes through the heart, then the lungs, the liver and the

30

## THE SIRIUS MYSTERY

spleen the only blood goes through the pancreas, the kidneys, the intestines  
 and the genitals.

The Dogon say ' the food you eat, the beverage you drink, that Amma  
 changes into red blood, white blood is a bad thing' 40 They also say 'The  
 essence of nourishment passes into the blood' 41 They know that the blood  
 passes into the internal organs 'starting with the heart' 42 The Dogon even seem  
 to understand the role of oxygen 'or at least, air' entering the bloodstream  
 For they equate air with 'the word' which they say enters the bloodstream  
 bringing 'nourishment of the interior' by 'the impulse raised by the heart'  
 The 'integration of the "word" (air) into the body also has to do with the  
 food nourishing the blood. All the organs of respiration and digestion are  
 associated with this integration 43

The Milky Way, likened as I said to a circulation of the blood, is described  
 further: ' the term yalu ulo designates the Milky Way of our galaxy which  
 sums up the stellar world of which the Earth is a part, and which spins in a

spiral . (it encompasses) the multiplication and the development, almost

infinite, of the spiroidal stellar worlds that Amma created (there are)  
 spiralling worlds that fill the universe infinite and yet measurable 44 Amma is  
 the chief god, the creator of the universe, to the Dogon. There is an interesting  
 account of Amma and the creation 'The active role of fermentation at the time  
 of the creation is recalled in the present brewing of beer the fermentation of  
 the liquid constitutes a "resurrection" of the cereals destroyed in the brewing

Life is comparable to a fermentation "Many things were fermenting  
 inside Amma" ' at the creation 48 And Spinning and dancing, Amma created  
 all the spiralling worlds of the stars of the universe '46 ' Amma's work rea-  
 lized the universe progressively, it was made up of several stellar worlds  
 spiralling around.'47

The Dogon have no difficulty in conceiving of intelligent life all over the  
 universe. They say 48



The worlds of spiralling stars were populated universes for as he created things, Amma gave the world its shape and its movement and created living creatures. There are creatures living on other Earths' as well as on our own. this proliferation of life is illustrated by an explanation of the myth, in which it is said man is on the 4th earth, but on the 3rd there are 'men with horns' inneu gammurugu, on the 5th, men with tails' inneu du.logu on the 6th, 'men with wings' inneu bammo, etc. This emphasizes the ignorance of what life is on the other worlds but also the certainty that it exists.

The Dogon know that the Earth turns on its own axis. When the fox walks over the tables of divination which have been drawn in the sand, the planet begins to turn under the action of (the fox's) paws. 4\* "When the only traces that are visible are made by the tail the image is likened to the movement of the Earth turning on its own axis, it is said: "The Fox turned with his tail the Earth turned on its own axis" 50 So the divination table represents the Earth "which turns because of the action of the Fox's paws" as he moves along the registers, while the instruction table represents the space in which the

## THE KNOWLEDGE OF THE DOGON

31

Earth moves, as well as the sun and the moon, which were placed by Amma out of his reach 51 The instruction table here referred to has twelve registers and constitutes a lunar calendar with each register representing a month. It is Figure 96 in *Le Renard Pale*. These twelve months, then, are 'the space in which the Earth moves' that is, one year's orbit around the sun. And within this orbit, the Earth's rotations on its own axis every day take place. The orbit around the sun is the Earth's space.

The Dogon know perfectly well that it is the turning of the Earth on its axis which makes the sky seem to turn round. They speak of the apparent movement of the stars from east to west, as men see them. 52 The Dogon are thus free from the illusions of our European ancestors, who thought the sky and stars wheeled round the Earth (though there was an exception to such primitive notions in Europe which no historian of science has ever reported, at least as far as I have been able to discover after a great deal of searching. I have summarized this secret tradition in Appendix 1, and pointed out its connection with the Sirius mystery.)

The placenta is used by the Dogon as a symbol of a 'system' of a group of stars or planets. Our own solar system seems to be referred to as 'Ogo's placenta', 53 whereas the system of the star Sirius and its companion star and satellites, etc., is referred to as 'Nommo's placenta' 54 Nommo is the collective name for the great culture-hero and founder of civilization who came from the Sirius system to set up society on the Earth. Nommo or, to be more precise, the Nommos were amphibious creatures, and are to be seen in the two tribal drawings in Figure 32 and Figure 34 in this book. These Nommos are more or less equivalent with the Sumerian and Babylonian tradition of Oannes. All

Of this subject is discussed in Chapter Eight, where it is necessary to consider details of what kind of creatures may live on a planet in the Sirius system. For the moment we are really more concerned with the Dogon astronomical and other scientific knowledge. Their descriptions of 'spacemen' and landings of 'spaceships' or at least what seem to be such are left to Chapter Eight.

Here is the way in which Griaule and Dieterlen record the Dogon beliefs about the two cosmic placentas I have just mentioned.<sup>55</sup>

Two systems, that are sometimes linked together, intervene, and are at the origin of various calendars, giving a rhythm to the life and activities of man.

One of them, nearest to the Earth, will have the sun as an axis, the sun is the testament to the rest of Ogo's placenta, and another, further away, Sirius, testament to the placenta of the Nommo, monitor of the Universe.

The movements of the bodies within these 'placentas' are likened to the circulation of blood in the actual placenta, and the bodies in space are likened to coagulations of blood into lumps. This principle is also applied to larger systems. In the formation of the stars, we recall that the "path of the blood" is represented by the Milky Way,<sup>56</sup> the planets and satellites (and

companions) are associated to the circulating blood and to the "seeds" that

flow with the blood.<sup>57</sup> The system of Sirius, which is known as 'land of the fish',<sup>58</sup> and is the placenta of Nommo, is specifically called the 'double placenta in the sky'<sup>59</sup> referring to the fact that it is a binary star system. The 'earth'

which is in the Sirius system is 'pure earth', whereas the 'earth' which is in our solar system is 'impure earth'.<sup>60</sup>

The landing of Nommo on our Earth is called 'the day of the fish',<sup>61</sup> and the planet he came from in the Sirius system is known as the '(pure) earth of the day of the fish' not (our) impure earth.<sup>62</sup> In our own solar system all the planets emerged from the placenta of our sun. This is said of the planet Jupiter<sup>63</sup> which emerged from the blood which fell on the placenta. The planet Venus was also formed from blood which fell on the placenta.<sup>64</sup> (Venus was blood red when she was created, her colour fading progressively.<sup>65</sup>) Mars, too, was created from a coagulation of 'blood'.<sup>66</sup> Our solar system is, as we have noted, called the placenta of Ogo, the Fox, who is impure. Our own planet Earth is, significantly, 'the place where Ogo's umbilical cord was attached to his placenta' and recalls his first descent.<sup>67</sup> In other words, the Earth is where Ogo 'plugged in', as it were, to this system of planets. What Ogo the Fox seems to represent is man himself, an imperfect intelligent species who 'descended' or originated on this planet, which is the planet in our solar system.

to which the great umbilical cord is attached. Ogo is ourselves, in all our cosmic impurity. It comes as a shock to realize that we are Ogo, the imperfect, the meddler, the outcast. Ogo rebelled at his creation and remained unfinished. He is the equivalent of Lucifer in our own tradition in the Christian West. And in order to atone for our impurity it is said over and over by the Dogon that the Nommo dies and is resurrected, acting as a sacrifice for us, to purify and cleanse the Earth. The parallels with Christ are extraordinary, even extending to Nommo being crucified on a tree, and forming a eucharistic meal for humanity and then being resurrected. But these religious elements are not the subject with which I propose to deal. Let each reader pursue them as he sees fit, on his own initiative. I only raise the subject that, as Ogo, we may be cosmic pariahs, because I only hope that we must not always remain so. The Dogon seem to hold out hope of 'redemption' just as Jesus Christ did in his great message to the world. Redemption can mean what you want it to mean. But perhaps it would be more sensible to view 'sin' less as a sort of infraction of social rules and more as a form of impurity such as Ogo represents. The perversions of Christianity have always seemed to me to incorporate a perversion of the notion of 'sin' and the means by which 'sin' can be exploited as a means of temporal blackmail over other human beings. To rid ourselves of some impurity may be closer to what is needed, and those writers who have speculated that we suffer from a genetic fault may even be correct. If so, are we actually in cosmic quarantine at this moment?

We are told that the Nommo will come again. A certain 'star' in the sky will appear once more<sup>68</sup> and will be the testament to the Nommo's resurrection. When the Nommo originally landed on Earth, he 'crushed the Fox, thus marking his future domination over the Earth which the Fox had made'.<sup>69</sup> So perhaps man's brutish nature has already been sufficiently subdued in our distant past. Perhaps it was those visitors whom the Dogon call the Nommos who really did 'crush the Fox' in us, who all but destroyed Ogo, and have given us all the best elements of civilization which we possess. We remain as a curious mixture of the brute and the civilized, struggling against the Ogo within us.

The Dogon seem to have come to terms with life, amid the bewildering

## THE KNOWLEDGE OF THE DOGON

33

multiplicity of heavenly motions in which they exist. The Earth turns on its own axis and makes a great circle (around the Sun). The moon turns like a conical spiral around the earth. The Sun distributes light in space and on the earth with its rays.<sup>70</sup> The sun is 'the remainder of Ogo's parenta'<sup>71</sup> and the centre of our system. For some reason, which they say is the visitation to earth of the amphibious bringers of civilization from there, the Dogon centre their life and religion not on all this glorious panoply of solar and planetary activity of which they know, but on the system of a nearby star and its invisible companions. Why? Can it really be for the reason they say? And if so, will the Nommo come again? We should really investigate the details of the

Dogon knowledge as fully as possible, for a start. In Le Renard Pale, as opposed to the earlier article reproduced here, it is said, for instance, that the star emmeya in the system of Sirius may have an orbital period of thirty-two years instead of the fifty years which others maintain. It is larger than Sirius B and 'four times lighter'. In relation to Sirius B, 'Their positions are straight. It is watched over by Sirius B and acts as an intermediary, transmitting Sirius B's orders.'<sup>72</sup>

Does such a body exist? Can we treat Dogon prognostications as evidence to be tested? Dr Lindenblad says he cannot find evidence of a Sirius C of the kind which was presumed earlier by astronomers. But can evidence be found of the kind of Sirius C suggested by the Dogon? And if such a discovery were made, would it conclusively establish the validity of the Dogon claims?

Among the Dogon, an allusion to the great Creator's immortality and stability is expressed in good wishes of greetings or farewell that are addressed to a friend or relative. 'May the immortal Amma keep you seated.'<sup>73</sup> It is just as well that we keep our seats, for we are about to launch into the dark waters of our planet's past, which may bring quite an alteration of our normal conceptions of it. For beyond the fact that a culture contact between ourselves and an alien civilization from outer space may have taken place of which we may find some evidence from our own ancient cultures, we may discover that the ancient world, the further back one goes in time, tends to develop a more and more odd flavour. The mysteries become denser, the strangeness thicker and more viscous. Just as in tracing the origins of sugar one goes from lighter syrup back to the thick and pungent molasses which develops, it seems, quantities far removed from one's expectations at the beginning, so with the past. Its doors encrusted with almost solid cobwebs give off the stench of air last breathed by ancestors forgotten by us all.

## Notes

1. Cameron, A. G. W., ed., *Interstellar Communication*, W. A. Benjamin, Inc., New York, 1963. See p. 75 (Calvin), p. 88 (Huang), p. 110 (Cameron), and particularly p. 176 (Drake).

2. For account see *Sky and Telescope*, June 1973, p. 354. Publications: Lindenblad, Irving, 'Relative Photographic Positions and Magnitude Difference of the Components of Sirius' in *Astronomical Journal*, 75, no. 7 (September 1970), pp. 841-8, and 'Multiplicity of the Sirius System' in *Astronomical Journal*, 78, no. 2 (March 1973), pp. 205-7.

3. Sagan, C. and Shklovskii, I. S., *Intelligent Life in the Universe*, Dell Publishing Co., New York, 1966, pp. 437, 440-64.

4. The astronomer Johann Friedrich Bessel in 1834. Just before his death in 1844 he decided

Sirius must be a binary system. In 1862 the American Alvan Clark looked through the

largest telescope then existing and saw a faint point of light where Sirius B should be, confirming its existence. In 1915 Dr W. S. Adams of Mt Wilson Observatory made the necessary observations to learn the temperature of Sirius B, which is 80000, half as much again as our sun's. It then began to be realized that Sirius B was an intensely hot star which radiated three to four times more heat and light per square foot than our sun. It then became possible to calculate the size of Sirius B, which is only three times the radius of the Earth, yet its mass was just a little less than that of our sun. A theory of white dwarfs then developed to account for Sirius B and other white dwarfs were later discovered.

5 See previous note

6. Aitken, R. G., *The Binary Stars*, Dover Publications, New York, 1964, pp. 240-1. The account of Sirius extends from p. 237 to p. 241.

7 Multiplicity of the Sirius System, art. cit. (see above, Note 2)

8 *Mass Loss and Evolution in Close Binaries*, Copenhagen University, 1970, pp. 190-4. (A seminar held in Elsinore Castle, with Lauterborn as a participant.)

9 Op. cit. (Note 6 above)

10 Op. cit. (Note 3 above) Chapter 33

11 See for instance the book *Interstellar Communication*, op. cit. (Note 1 above), an anthology with contributions from nineteen astronomers and scientists.

12 Ibid., p. 75

13 Ibid., p. 92

14 Ibid., p. no.

15 Ibid., pp. 232-5

16 Op. cit. (Note 3 above), pp. 440-64

17 Ibid.

18 See for instance Pritchard, J. B. *Ancient Near Eastern Texts relating to the Old Testament*, Princeton University Press, 1955, p. 42, the introductory remarks to trans. of 'The Deluge' and also pp. 93-5, account of the Flood.

19 Griaule, M., and Dieterlen, G., 'Un Systeme Soudanais de Sirius' *Journal de la Societe des Africanistes*, Tome XX, Fascicule 1, 1950, pp. 273-94. An English translation of this article follows Chapter One in this book.

20 Griaule, Marcel, and Dieterlen, Germaine. *Le Renard Pale* (Tome I, Fascicule 1), Institut

d Ethnologie, Musée de l'Homme, Palais de Chaillot, Place du Trocadéro, Paris 16\*  
(75016 Paris), 1965 544 pp.

21 Ibid., p. 529

22 Nine references are given to Baize's publications, extending to 1938, and one given to Schatzman in *L'Astronomie*, 1956, pp. 364-9

23 *Le Renard Pale*, p. 478

24 Ibid., pp. 480-1 25 Ibid., pp. 480-1 26 Ibid., p. 486

27 Ibid., p. 481 28 Ibid., p. 226. 29 Ibid., p. 264

30 Ibid., p. 329 31 Ibid., p. 292. 32 Ibid., p. 291

33 Ibid., p. 292 34 Ibid., p. 321 35 Ibid., p. 321

36 Ibid., p. 323 37 Ibid., p. 323

38 Aubrey J., *Brief Lives*, Penguin, London, 1972 See entry for Harvey William, pp. 290-1

39 *Le Renard Pale*, p. 348

40 Ibid., p. 287 n. 1 41 Ibid., p. 141 42 Ibid., p. 141

43 Ibid., p. 141 44 Ibid., pp. 102-4 45 Ibid., p. 128

46 Ibid., p. 163 47 Ibid., p. 168 48 Ibid., p. 170 n. 2

49 Ibid., p. 276. 50 Ibid., p. 279, inc. n. 4 51 Ibid., p. 280.

52 Ibid., p. 335 53 Ibid., p. 470 54 Ibid., p. 470

55 Ibid., p. 470 56 Ibid., p. 489 57 Ibid., p. 323

58 Ibid., p. 384. 59 Ibid., p. 384 60 Ibid., p. 381

61 Ibid., p. 381 62 Ibid., p. 381 63 Ibid., p. 287

64 Ibid., p. 248 65 Ibid., pp. 248-9 66 Ibid., p. 249

67 Ibid., p. 219 68 Ibid., p. 440 69 Ibid., p. 440

70 Ibid., p. 477 71 Ibid., p. 477 72 Ibid., p. 475

73 Ibid., p. 499 n. 2

## A Sudanese Sirius System

by

M. GRIAULE and G. DIFTERLEN

Note: The following article is translated and published in its entirety. It is written for professional anthropologists and ethnographers, and is presented here for the reader who is sufficiently interested in the subject to wish to pursue the source material. It is, therefore, supplementary information and is not essential for the reader who merely wishes to follow the argument.

## FOREWORD

The indigenous knowledge about the Sirius system which is set forth in this chapter has been gathered from four Sudanese peoples: the Dogon in Bandiagara, the Bambara and the Bozo in Segou and the M'niarka in Kouhala.

The main investigation was carried out among the Dogon between 1946 and 1950, where the four major informants were:

Innekouzou Dolo, a woman aged between sixty-five and seventy, ammayana 'priestess of Amma', and soothsayer, living in the Dozyou-Orey quarter of Ogo. du Bas (Lower Ogo) Sanga du Haut (Upper Sanga) Tribe: Arou. Language: Sanga.

Ongnonou Dolo, between sixty and sixty-five years old, patriarch of the village of Go, recently established by a group of Arou in the south-west of Lower Ogo. Language: Sanga.

Yebene, fifty years old, priest of the Bmou Yebene of Upper Ogo., living in Bara (Upper Sanga) Tribe: Dyon. Language: Sanga.

Manda, forty-five years old, priest of the Bmou Manda, living in Orosongo in Wazouba. Tribe: Dyon. Language: Wazouba.

The system as a whole was expounded by Ongnonou, its various details by the other informants. Although he was not responsible for drawing up the Sigui calendar, Ongnonlou was acquainted with the principles behind it and, during the periods when the investigators were there, was able to obtain further information from the Arou at Yougo Dogoro: on the one hand and, on the other, from the permanent steward of the supreme chieftain of the Arou at Arou-by-Ibi. Ongnonlou is in fact patriarch of the family from which the next holder of the title will be designated when the next holiday comes around.

Ongnonou's learning, within an extremely secret body of knowledge, thus represents an initial acquaintance or, to use a Bambara expression, a 'slight acquaintance', and this point should be kept in mind. Just as, for the layman, the star Sirius is the brightest star in the sky, attracts his gaze, and plays the major role in the computation of the Sigui, so the rules of the Sirius system as revealed to the initiated in the first instance are at once simplified in some parts and complicated in others, so as to divert the attention from calculations which are more secret by far.

It must therefore be understood, once and for all that the system described here represents one phase of the revelations permitted to initiates who are top-ranking but not specifically responsible for the calculations to do with this part of the sky.

For our part, the documents gathered together have not given rise to any original

hypothesis or research. They have been simply pieced together in such a way that the accounts of the four principal informants are merged into one and the same statement. The problem of knowing how, with no instruments at their disposal, men could know the movements and certain characteristics of virtually invisible stars has not been settled, nor even posed. It has seemed more to the point, under these special circumstances, to present the documents in the raw.

### THE CALCULATION OF THE TIME OF THE SIGUI

Every sixty years<sup>8</sup> the Dogon hold a ceremony called the Sigui (ceremony). Its purpose is the renovation of the world, and it has been described at length by them in 1931.<sup>4</sup> Since the beginning of this investigation, we were faced with the question of determining the method used to calculate the period separating two Sigui ceremonies. The common notion, which dates back to the myth of creation, is that a fault in the Yougo rock, situated at the centre of the village of Yougo Dogorou,<sup>8</sup> lights up with a red glow in the year preceding the ceremony. This fault contains various stars, in particular busts of Andoumboulou (the name given to the people of small stature who formerly lived in the rocks), and a rock painting called amma bara, 'god heaps', to which we shall refer later. Furthermore, and before this red glow appears, a spot situated outside the village becomes covered with elongated gourds of a type which no one would have sown.

When these signs are observed, an apparently simple procedure of calculation is carried out, solely by the people of Yougo Dogorou who belong to the Arou tribe:<sup>6</sup> the council of elders assesses the interval by means of thirty-two yearly drinking bouts when beer made from millet is drunk; and the eldest elder marks up each bout with a cowrie shell.

These bouts are held about one month before the first rains, sometimes in May or June in a tent or shelter pitched to the north of the village centre.<sup>7</sup> But this rule is only theoretical: between the last Sigui, celebrated at the beginning of the century, and 1931<sup>8</sup> there has been only one bout, halfway through the period; but the two yearly cowries were set down and gathered into a pile representing the first thirty years. From 1931 onwards, the drinking bouts took place every two years. When the second pile consisting of fifteen cowries has been collected, the second Sigui of the twentieth century will be celebrated.<sup>9</sup>

According to Manda, the priest, the calculation of the Sigui is recorded above the door of the sanctuary of Binou by two figures made of millet pulp representing the god



Amma and his son, Nommo, Instructor of the new world.<sup>10</sup> The first consists of a vertical oval – the egg of the world – and its major axis, Amma in the original darkness. In the right-hand half – each year is marked with a dot, starting from the bottom. When the seventh year comes round, a kind of trident is drawn on the outside, as an extension to the line of dots. The same thing is done on the left-hand side, in the order top-to-bottom. Fourteen years are counted in this way – the seven twin years during which the world was created, and to which a unit, symbolizing the whole, is added.<sup>11</sup> Diagrammatically speaking, the figure shows the god's last gesture – raising one hand and lowering the other thereby showing that sky and earth are made.

This drawing is repeated four times, making it possible to reckon a period of sixty years; it is accompanied by the figure of the Instructor,<sup>12</sup> composed of two vertical legs supporting a head atop a long neck. During the first thirty years which are recorded by two ovals, the figure features only the right leg. During the second thirty-year period, the left leg is made a little longer each year in such a way that when the Sigui actually occurs it is the same length as the right leg. It is by allusion to this figure that people talk about the Sigui 'getting to its feet' during this latter period.

## THE KNOWLEDGE OF THE DOGON

### THE CALCULATION OF THE SIGUI CEREMONIES

37

When it is time for the Sigui – the elders gathered in the tana-tono shelter at Yougo draw a symbol on the rock with red ochre (fig. 1) – which represents a kanaga mask,<sup>13</sup> this, in turn, represents the god Amma – a hole is made in the ground below it symbolizing the Sigui, and thus Amma in the egg of the world. In effect these two signs should be read in the opposite order – Amma, in the shadow of the egg (the hole) reveals himself to men (the red design) in his creative posture (the mask depicts the god's final gesture, showing the universe).<sup>14</sup>

The hole is also interpreted as the hole which must be dug to put seeds in. From this viewpoint the holes are arranged in series of three, connoting three Siguis, placed respectively beneath the sign of three seeds, after which they are named. Thus the Sigui at the beginning of this century was called emme sigi, the 'sorghum Sigui'; the next one will be called yu sigi – the 'millet Sigui' – and the one after nu sigi, the 'haricot Sigui'.

In theory, then, it would seem possible to record the Siguis using this simple method.

In practice, the holes become obliterated and the painting, more often than not, is touched

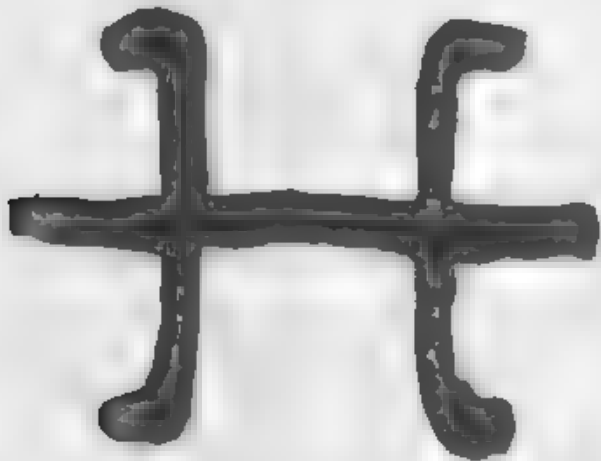
up instead of being reproduced and thus forming part of a countable series. But there is

another figure painted on the facade of the sanctuaries which reveals rather more

specific data; it is called sigi lugu, 'calculation of the Sigui', and consists of a line of

vertical chevrons, the notches of which are painted alternately black, red, and white; each colour corresponds to a seed, the first to millet, the second to the haricot and the third to sorghum (fig. 11). This line can be read in two ways. Either by using just one counting system (for example the left hand one), whereby each notch is the equivalent of twenty years, here, the notch upon which a Sigui actually falls is carried over to the following series or, by taking the whole figure and counting twenty years for each notch, regardless of its positioning (the right column in fig. 11) here, the notch upon which a Sigui falls is recounted.

More consistent evidence of the celebration of the Sigui is provided by the large



*Figure 1. The Kavaga sign, connoting the fifty year ceremonies, at Yougo Dogonou (indigenous painting).*

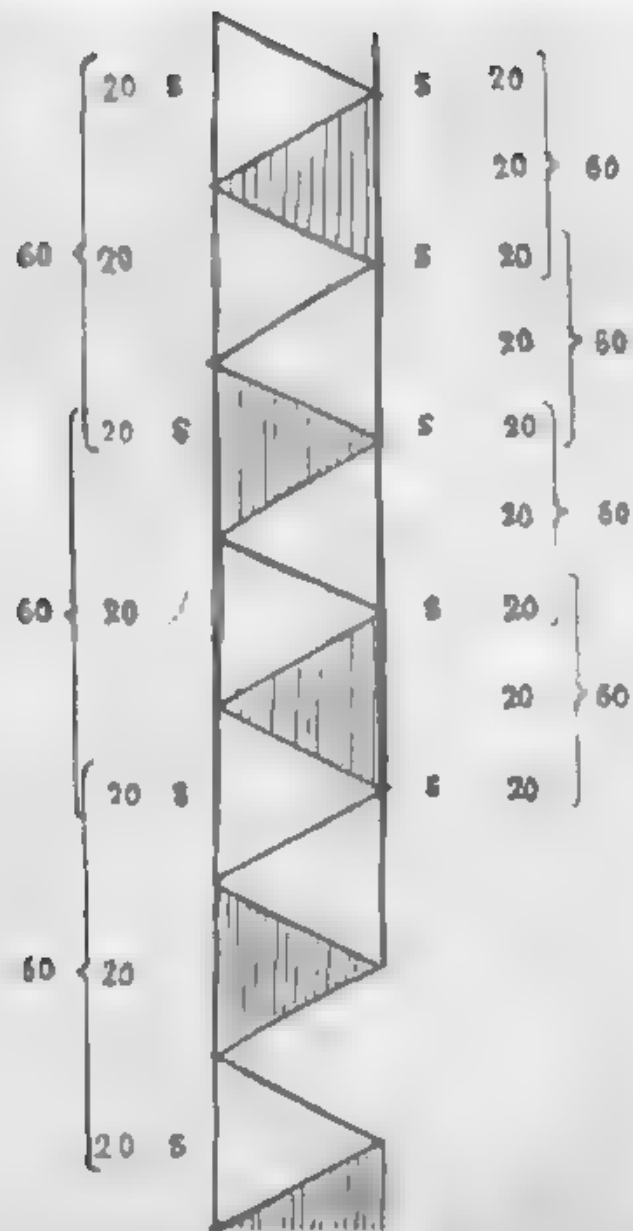


Figure ii. The calculation of the Sogut

wooden mask, whose carving is one of the major concrete purposes of the ceremony. This mask usually of considerable size is seldom used, and is kept in some shelter or

hideaway in the rocks, along with those which have been carved at previous ceremonies. The care with which these masks are treated – for in some ways they are the village archives – means that it is not uncommon to come across series of three or four of them, the oldest of which date back, respectively, to 1780 and 1720, 16 give or take a year or two. In exceptional cases, when the shelter has been well selected and under constant surveillance, the series may be longer still. Thus at Ibi, in 1931, nine poles were counted, and

## THE KNOWLEDGE OF THE DOGON

39

these must have succeeded three more which had been reduced to a few fragments and piles of dust and were still visible, as were the special places earmarked for them at the back of the shelter, all perfectly protected from the damp, vermin and animals. The oldest in the series of nine, which showed a continuous progression of ageing in the course of time,<sup>17</sup> thus date from the beginning of the fifteenth century – and if the three others are taken into account, the remnants of the earliest would date back to the first half of the thirteenth century.<sup>18</sup>

It is not easy to come across material evidence dating back further than the traces of these poles at Ibi. But there is another object, existing in a single edition, which is fashioned during these Sigui ceremonies and which might also be a significant milestone in the calculation process. With the festival in mind, each regional Hogon, as well as the supreme Hogon of Arou, has a fermentation stand woven out of baobab fibres: this stand is used during the preparation of the first ritual beer. This beer is distributed in small quantities to each family, it is then added to everybody's cup, and thus ensures the homogeneity of the beer drunk by the community. In addition to this, all the other fermentation stands are associated, by contact, with the principal one, which is exceptionally large: the lid measures 40 cm. (16 in.) in diameter, and the four pompoms are the size of the normal object. As a result, it can only enter the large jars.

These objects are kept in the Hogon's house where they are hung from the main Ibram, and thus form a permanent sequence. Ongnonlou saw six or seven of them in the official residence of the Hogon of Sanga – the latter, one of the oldest men in Dogon

country – has it that his great-great-grandfather had seen eight others which preceded the oldest in the present series.<sup>19</sup> Assuming a total of fourteen objects for the Sanga

chieftaincy, the first – which almost certainly does not denote the first ceremony held in this region – would have been woven in the twelfth century, if one reckons on the period separating two Siguis being sixty years.

Again Ongnonlou counted a series of eight in the house of the supreme Hogon of the Arou, at Arou-by-Ibi. But he adds that the number 'should' be twenty-four, although he cannot explain if there is an ideal series which a complete sequence would aim for – or which, conversely, would correspond to reality if the fibres had not turned to dust.<sup>20</sup>

The methods described above for both keeping track of the ceremonies and for calculating the intervals between Siguis are simple and tend to be mnemotechnic. For the initiate they simply act as understudies for other more complex practices and knowledge.

to do with the Sirius system. The Dogon names for this star – *sigi tolo*, star of the Signi 21 or *yasigi tolo*, star of Yasigi, 22 – sufficiently indicate its relation with the ceremony of the renovation of the world which takes place every sixty years.

Sirius, however, is not the basis of the system – it is one of the foci of the orbit of a tiny star called *Digitaria*, *po tolo*, 23 or star of the Yourougon, 24 *yurugu tolo*, which plays a

crucial role, and which, unaided as it were, hogs the attention of male initiates.

This system is so important that, unlike the systems of other parts of the sky – it has not been assigned to any particular group. In effect the Ono and Dommo tribes govern the stars, the former including Venus rising among its attributes, the latter Orion's belt. The sun should be assigned to the most powerful tribe, the Arou, but so as not to be guilty of excess, the Arou handed the sun over to the Dyon, who are less noble, and hung on to the moon. As far as the star *Digitaria* and the system to which it belongs are concerned, these are common to all men.

### THE ORBIT OF DIGITARIA

The orbit described by *Digitaria* around Sirius is perpendicular to the horizon, and this

is aided to in one of the most common ceremonies in which masks play a part.

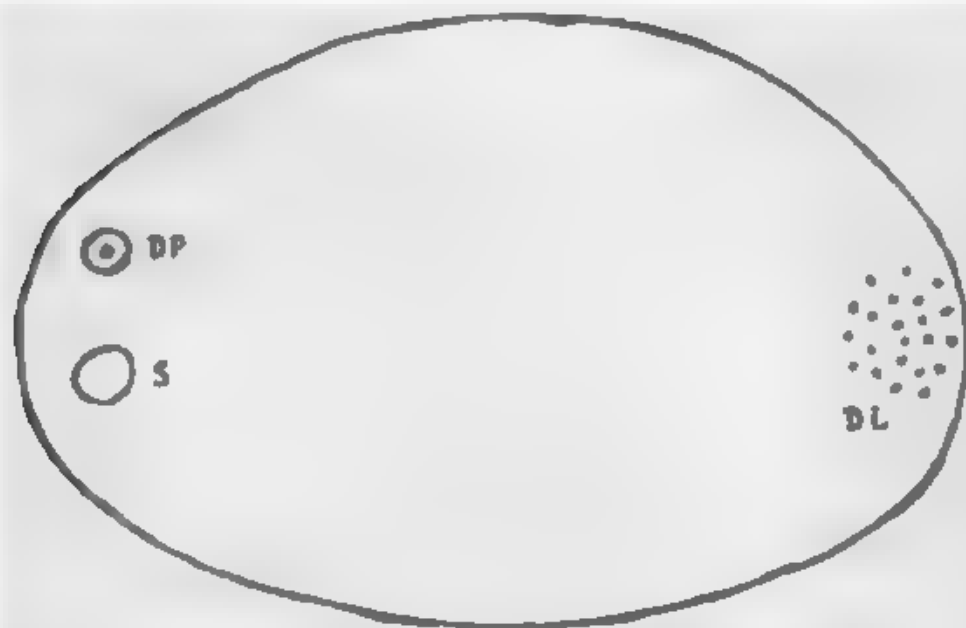


Figure iii. The trajectory of the star *Digitaria* around Sirius



Figure 6: The symbolism of the trajectory of Digitaria. S: Sirius, A: knife, B: foreskin

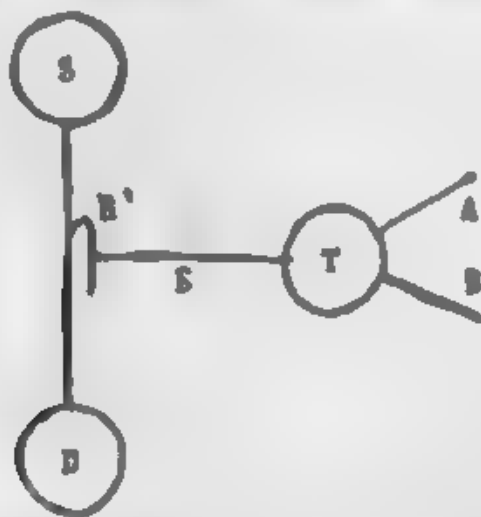


Figure 7: The symbolism of Digitaria. S: Sirius, D: Digitaria, T: trajectory of Digitaria. A: knife, B: penis, B' and B: foreskin

The period of the orbit is counted double, that is, one hundred years,<sup>28</sup> because the Sigiis are convened in pairs of twins', so as to insist on the basic principle of twin-ness.<sup>29</sup> It is for this reason that the trajectory is called *muni*, from the root *monye* 'to reunite', from which the word *muno* is derived, which is the title given to the dignitary who has cele-

brated (reunited) two Sigiis

According to Dogon mythology before the discovery of Digitaria the supreme chief was sacrificed at the end of the seventh year of his reign (the seventh harvest). This was the only computation known about; the year-unit had not then been established. The spiritual and material principles of the victim were conveyed to Digitaria to regenerate

the victim whose existence was known but whose features had not been revealed to man, because the star was invisible.

This was the rule for forty-nine years for the first seven chiefs who thus nourished the

#### 40 THE SIRIUS MYSTERY

laba ozi po

ozago po ya

(the path of the mask (is) straight (vertical)  
this path runs straight)

But if one takes the pun into account familiar to the initiated between po:25 'straight' and po: Digitaria, the translation becomes:

the path of the mask (is the star) Digitaria  
the path runs (like) Digitaria

A figure made out of millet pulp (fig. 111) in the room with the dais in the house of the Hogon of Arou gives an idea of this trajectory which is drawn horizontally: the oval (lengthwise diameter about 100 cm. = 40 in.) contains to the left a small circle, Sirius (S), above which another circle (DP) with its centre shows Digitaria in its closest position. At the other end of the oval a small cluster of dots (DL) represent the star when it is farthest from Sirius. When Digitaria is close to Sirius, the latter becomes brighter; when it is at its most distant from Sirius, Digitaria gives off a twinkling effect, suggesting several stars to the observer."

This trajectory symbolizes excision and circumcision, an operation which is represented by the closest and furthest passage of Digitaria to Sirius. The left part of the oval is the foreskin (or clitoris), the right part is the knife (fig. 112).

This symbolism is also expressed by a figure used for other performances<sup>2</sup> (fig. 113). A horizontal figure rests on a vertical axis which connects two circles: S (Sirius) and D (Digitaria); the centre of the figure is a circle T, which represents the trajectory of D. The line E is the penis, the hook B' the foreskin. Two horns hinge on the circle and reproduce once again the two parts of the trajectory (cf. fig. 112). A, the knife; B, the foreskin. Thus the Sirius system is associated with the practices of renovating people, and, consequently in accordance with the Black mentality with the ceremonies which

celebrate the renovation of the world



Figure 11 The origin of the spiral of creation: indigenous drawing: actual size

ented in Wazouba either by a dot or by a sac enveloping a concentric circle of ten dots (the eight ancestral Nommos and the initial couple of Nommo). Its continual movement produces beings whose souls emerge at intervals from the dots and are guided towards the star Sorghum<sup>41</sup> which sends them on to Nommo. This movement is copied by the rhombus which disperses the creation of the Yourougou in space. Six figures are arranged around the circle, as if ejected from it (fig. vii).<sup>42</sup>

a two-pronged fork: trees

a stem with four diagonal lines: small millet;

four dots arranged as a trapezium: cow with its head marked by a short line;<sup>43</sup>

four diverging lines starting from the base of a bent stem: domestic animals,

four dots and a line: wild animals

an axis flanked by four dots: plants and their foliage.<sup>44</sup>

The original work is likewise symbolized by a filter-basket made of straw called *nun goro*, 'bean cap'. This utensil consists of a sheath in the form of a continuous helical spiral, the centre of which starts at the bottom.<sup>45</sup> The spiral supports a network of double radii.<sup>46</sup> The spiral and the helix are the initial vortical motion of the world; the radii represent the inner vibration of things.



Originally, then, Digitaria is a materialized, productive motion. Its first product was an extremely heavy substance which was deposited outside the cage of movement represented by the filter basket.<sup>47</sup> The mass thus formed brought to mind a mortar twice as big as the ordinary utensil used by women.<sup>48</sup> According to the version told to the men, (his mortar has three compartments: the first contains the aquatic beings, the second, terrestrial beings, and the third, the creatures of the air. In reality the star is conceived of as a thick oval forming a backcloth from which issues a spiral with three whorls (the three compartments).

According to the version instructed to the women, the compartments are four in number and contain grain, metal, vegetables and water. Each compartment is in turn made up of twenty compartments: the whole contains the eighty fundamental elements.

The star is the reservoir and the source of everything. "It is the granary for every thing in the world." The contents of the star-receptacle are ejected by centrifugal force, in the form of infinitesimals comparable to the seeds of Digitaria exilis which undergo rapid development. "The thing which goes (which) emerges outside (the star) becomes as

42

## THE SIRIUS MYSTERY

star, and enabled it to renovate the world periodically. But, having discovered the star the eighth chief resolved to avoid the fate of his predecessors: with his son's complicity, he feigned death, lay dormant for a few months and reappeared before the chief who had succeeded him; he announced that he had been to Digitaria, knew its secrets, and that from then onwards, every Hogon would reign for sixty years: the period which would later separate one Sigui from the next.<sup>30</sup> Restored to office, he raised the level of the sky which, hitherto, had been so close to the earth that it could be touched,<sup>31</sup> and he completely revealed the method of calculating time, and the method of reckoning.

Until that time the ceremonies celebrating the renovation of the world had in fact taken place every seventh harvest;<sup>32</sup> the Hogon made his calculations on the basis of five day periods, a unit which established the week as it still is today, and five harvest cycles. And as he was eighth in line, he counted eight cycles, in other words forty years, and the number forty became the basis for computation: the month had forty days, the year forty weeks (of five days each). But the Hogon lived sixty years, a number which was interpreted as the sum of forty (basis of calculation) and twenty (the twenty fingers and toes, symbolizing the person and thus, in the highest sense of the word, the chief). Thus sixty became the basis for calculations<sup>33</sup> and it was first applied to establish the period of time separating two Siguis. Although the orbit of Digitaria takes approximately fifty years and although it corresponds to the first seven reigns of seven years respectively, it none the less computes the sixty years which separate two ceremonies.<sup>34</sup>

As well as its movement in space, Digitaria also revolves (rotates) upon itself over the period of one year and this revolution is honoured during the celebration of the bado rite. On this occasion it ejects from its three spirals the beings and the things which it contains. This day is called badyu, 'sunny father', because it is marked by a general movement of the world which upsets people and places them in an unsure relationship with themselves and with each other.

## THE ORIGINS AND FEATURES OF DIGITARIA

The eighth Hogon instructed his people in the features of the star, and, more generally, of the Sirius system

Sirius appears red to the eye, Digitaria white. The latter lies at the origin of things 'God created Digitaria before any other star'.<sup>36</sup> It is the 'egg of the world', adunoted, the infinitely tiny and, as it developed, it gave birth to everything that exists, visible or invisible.<sup>36</sup> It is made up of three of the four basic elements: air, fire and water. The element earth is replaced by metal.<sup>37</sup> To start with, it was just a seed of Digitaria exilis,<sup>38</sup> pi, called euphemistically kize uzi, 'the little thing',<sup>39</sup> consisting of a central nucleus which ejected ever larger seeds or shoots in a conical spiral motion (fig. v1). The first seven seeds or shoots are represented graphically by seven lines, increasing in length, within the sac formed in turn by an oval symbolizing the egg of the world.

The entire work of Digitaria is summarized in a drawing whose various parts are carried out in the following order:<sup>40</sup> a vertical line issues from the oval – the first shoot to emerge from the sac; another segment, the second shoot, takes up a crosswise position, and thus supplies the four cardinal points – the stage of the world. The straightness of these two segments symbolizes the continuity of things, their perseverance in one state. Last, a third shoot, taking the place of the first, gives it the form of an oval which is open in its lower section, and surrounds the base of the vertical segment. The curved form, as opposed to the straight, suggests the transformation and progress of things. The personage thus obtained, called the 'life of the world' is the created being, the agent, the microcosm summarizing the universe.

In its capacity as the heavy embryo of a world issued each year, Digitaria is repres-



Figure vii. The star Digitaria (indigenous drawing: actual size<sup>50</sup>)

large as it every day.<sup>51</sup> In other words, what issues from the star increases each day by a volume equal to itself.

Because of this role, the star which is considered to be the smallest thing in the sky is also the heaviest: 'Digitaria is the smallest thing there is. It is the heaviest star.'<sup>52</sup> It consists of a metal called sagala,<sup>53</sup> which is a little brighter than iron and so heavy that all earthly beings combined cannot lift it'. In effect the star weighs the equivalent of 480 donkey loads<sup>54</sup> (about 38,000 kg = 85,000 lb), the equivalent of all seeds, or of all the iron on earth,<sup>6</sup> although, in theory, it is the size of a stretched ox skin or a mortar.

#### THE POSITION OF DIGITARIA

The orbit of Digitaria is situated at the centre of the world, Digitaria is the axis of the whole world,<sup>56</sup> and without its movement no other star could hold its course. This means that it is the master of ceremonies of the celestial positions, in particular it governs the position of Sirius, the most unruly star: it separates it from the other stars by encompassing it with its trajectory.

#### OTHER STARS IN THE SIRIUS SYSTEM

But *Digitaria* is not *Sirius*'s only companion: the star *emme ya*, *Sorghum Female*, is larger than it, four times as light (in weight), and travels along a greater trajectory in the same direction and in the same time as it (fifty years). Their respective positions are such that the angle of the radii is at right angles. The positions of this star determine various rites at *Yougo Dogorou*. *Sorghum Female* is the seat of the female souls of all living or future beings.<sup>58</sup> It is euphemism that describes them as being in the waters of family pools: the star throws out two pairs of radii (beams) (a female figure) which, on reaching the surface of the waters, catch the souls.



Figure vii. The star of women

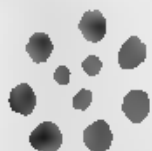


Figure ix. The star *Sorghum-Female*

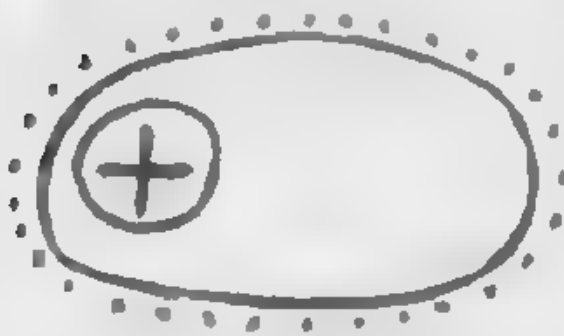


Figure x. The *Sorghum-Female* system

## THE KNOWLEDGE OF THE DOGON

45

It is the only star which emits these beams which have the quality of solar rays because it is the 'sun of women', *nyan nay*, 'a little sun', *nay dagi*. In fact it is accompanied by a satellite which is called the 'star of Women', *nyan toio*, or *Goatherd*, *enegrin* (literally goat-guide) a term which is a pun on *emme grin* (literally *sorghum guide*). Nominally then it would be more important as the guide of *Sorghum Female*. Furthermore, there is some confusion with the major star, the *Goatherd*, which is familiar to everyone.

The star of women is represented by a cross,<sup>58</sup> a dynamic sign which calls to mind the movement of the whole *Sirius* system (fig. viii).

Sorghum Female is outlined by three points, a male symbol of authority surrounded by seven dots, or four (female) plus three (male) which are the female soul and the male soul (fig. 1X)

Taken as a whole, the Sorghum Female system is represented by a circle containing a cross (the four cardinal directions), whose centre consists of a round spot (the star itself) and whose arms serve as a receptacle for the male and female souls of all beings. This figure, called the 'Sorghum Female pattern', emme ya tonu, occupies one of the Centres of an ellipse called 'the pattern of men', anam tonu, consisting of a full line called the 'goatherd's course', enegirin ozu, flanked by two dotted lines, the outside of which is the path of the male souls, and the inside the path of the female souls (fig. X)

The Sirius-Digitaria-Sorghum system is represented by a 'pattern of the Signi', signi tonu, consisting of an oval (the world) in which one of the centres is Sirius. The two alternate positions of Digitaria at the time of the Signi are marked and the positions at the same moment of Sorghum Female are marked on two concentric circles encompassing Sirius.





Figure 111. The Sirius system

The Sirius system as a whole is drawn at Sanga in different ways, in particular at the bado ceremony. On the facade of the residence of the great Hogon of Arou and inside the official houses assigned to the Hogons of Dyon, the course of these stars is represented by 'the pattern of the master of the star of the Shoemaker', dyan tolo bana tonu (fig. x1), composed of a vertical axis supporting, two-thirds of the way up, a bulge, Sirius (S) and broken at its base to form an elongated foot jutting to the left at right angles, the course of the star of the Shoemaker (C). It is topped by a semi-oval whose arms extend quite low down the meeting point (D) with this oval symbolizes Digitaria, whose course is traced by the right arm (F). But this arm is also the star of women whilst the left arm is Sorghum-Female (E). The lower part of the axis (SC), longer than the upper part (SD) reminds one that the Shoemaker (C) is farther than Sirius is from the other stars, and revolves in the opposite direction.

Thus it is that during the bado ceremony the oldest woman of the family draws, at the entrance to the house, the 'pattern of the world of women', nyan aduno tonu,<sup>59</sup> or 'pattern of the top and bottom of the world', aduno dale donu.e tonu (fig. x11).

It consists of an oval, the egg of the world, containing nine signs:

**Da** Digitaria. The open curve on the right indicates the acceptance of all the substances and matter placed in it by the Creator.

**Db** Digitaria in its second position. The open oval below marks the exit of the matter which spreads across the world, A and B also indicate the extreme positions of Digitaria in relation to Sirius.

The star Sorghum-Female counterpart of Digitaria. As it is the 'sun of women' it is placed at the centre of the egg, like the sun at the centre of the solar system. The oval is framed by two times two small vertical lines symbolizing the rays emitted by the star.

**S** Sirius, star of the Sigu' or 'star of Yasigu' The sign, so placed that it materializes



*Figure 41. The course of the stars of the Sirius system*

the liaison worked by Sirius between the two stars described above, consists of a kind of X with one right arm the ant, key dividing a curved arm, the lower part of which is Yasigu' and the other part the piece of the organ which is detached during excision. Although female, the ant is here depicted by a straight rod, as if it were a man. This marks its domination of Yasigu's feminity, for Yasigu' is maimed.

**R** The Yourougou A hook, made up of a circular arc and a straight segment indicates that the first movement of the Yourougou describes a curve which goes around the sky; falling short of the goal, it descended directly, as is shown by the right hand segment which is also the piece of bared placenta<sup>60</sup>

In effect, with Digitaria as the egg of the world (see earlier) this latter was split into two twin placentas which were to give birth respectively to a pair of Nommo Instructors. What happened, however, was that a single male being emerged from one of the placentas in order to find his twin, this being tore off a piece of this placenta, which became earth. This intervention upset the order of creation: he was transformed into an animal, the pale fox, yuruga,<sup>61</sup> and communicated his own impurity to the earth, which rendered it dry and barren. But the remedy to this situation was the sacrifice, to the sky, of one of the Nommo Instructors which had issued from the other placenta, and the descent of his twin to earth with life-giving, purifying rain.<sup>62</sup> The destiny of Yourougou is to pursue his twin to the end of time – the twin being his female soul at the same time. On the mythical level, Digitaria is thus considered to be the Yourougou held in space by Nommo, relentlessly revolving around Sirius, or Yasigu, in other words, and never capable of reaching it.

N – The figure of the Nommo consists of a vertical segment, Nommo in person, upon which, and slightly below the upper edge, rests a line broken into three unequal parts, the first is the seat of future female souls, the second the seat of the souls of the dead, and the third the seat of living souls.

Fa – The star of Women, nyan tolo. An embryonic spiral calls to mind that it is the satellite of Sorghum Female.

Fb – The 'sign of women', nyan tonu, consists of a diagonal line, man, cut by a line which ends in a convex curve, woman. This shows the contact between the sexes.<sup>63</sup> The rod is upright with astonishment at the sight of creation, which started with the system of women. Woman is a heavy bellied profile, ready to give birth.

Fc – The sex of women is depicted by an ova, which is open in the lower part, womb-world, ready for procreation, gaping downwards to spread the seeds.

## THE SIRIUS SYSTEM AMONG THE BAMBARA

The Bambara call Sirius 'the star of the foundation', sigi dolo, which is the same term used by the Dogon, and like them they call the star Digitaria fini dolo. "The expression fa" dolo fia, the two stars of knowledge', is generally attributed to it, because 'it represents in the sky the invisible body of Faro', conceived as a pair of twins.<sup>65</sup> This name also implies that the star is the seat of all learning.

The Sirius system is depicted on the chequered blanket called koso wala, 'coloured picture', consisting of ten sequences made up of some thirty rectangles coloured alternately indigo and white which symbolize, respectively, darkness and light, earth and sky, and, in Bambara mythology, Pemba and Faro. Scattered throughout there are twenty-three rectangles with different patterns of small stripes placed in the direction of the thread, alternating the indigo, white and red. Twenty of them represent stars or constellations – the other three respectively represent the rainbow, hailstones and rain. The fifth sequence in the centre, in which there is no coloured rectangle, symbolizes the Milky Way. The ninth sequence, at one end, contains five black (not indigo) rectangles



## THE KNOWLEDGE OF THE DOGON

49

which point to the 'fifth creation, in darkness, which will occur with the arrival of the waters to come' 66

Sig. dolo is first depicted alone 'in the cold season and in impurity' by the ninth rectangle (third sequence); it is next depicted flanked by fa dolo fla (two red lines) in the fifteenth rectangle (eighth sequence) 67

In Bambara mythology, Sirius represents Mousso Koroni Koundye, twin of Pemba, maker of the earth, a mythical woman whom he chased through space and was never able to catch. In every respect Mousso Koroni Koundye is comparable to Yasigui 68 She inaugurated circumcision and excision and, as a result, Sirius is the star of circumcision, for both Bambara and Dogon alike

## THE SIRIUS SYSTEM AMONG THE BOZO

The system is also known to the Bozo, who call Sirius sima kayne (literally: sitting trouser) and its satellite tononalema (literally: eye star)

### Notes

1 A member of the Bambara living in Bandiagara also confirmed the most important features

of the system.

a. Various pieces of information were supplied direct by the people of Yougo-Dogorou in 1931

, 1936, 1948, 1949 and 1950

3 We ourselves accepted this figure in 1931 and it can safely be retained for the time being

4 Cf. Griaule, *Masques Dogons, Travaux et Mémoires de l'Institut d'Ethnologie de l'Université de Paris*, vol. xxxiii (1938), chapter 1.

5 Ibid., pp. 167 ff., where this fault in the rock is described in detail

6. The Dogon are divided into four tribes, each of which had a different role at one time. The four are the Arou (soothsayers), the Dyon (farmers), the Ono (merchants), and the

Domino (who were confused in this respect with the Ono)

7 The spot is called tana tone, cf. Griaule, *op. cit.*, p. 17.

8 Or 1933

9 Probably in 1961 or 1963, if this computation is valid. (The information came from a

prominent member of the Yougo aged between fifty-five and sixty.) It is a matter of common knowledge that the next Sigui will not be celebrated for another ten years or so (we were told this in late 1950)

.0 These figures are described in M. Griaule and G. Dieterlen, 'Signes graphiques soudanais L'Homme, 3 (Paris: Hermann)

11 The Dogon count a week of five days as six days, just as in French a week of seven days is referred to as 'eight days' and a fortnight as 'fifteen days'

.2 For a discussion of this substitute for God the Creator cf. Griaule, Dieu d'eau, Paris, Editions du Chêne, 1948

.3 For a description of the mask cf. Masques Dogons, pp. 470 ff

.4 This information came from a prominent member of the Yougo Dogorou. According to all

the initiates, the kanaga mask represents on the one hand the static gesture of the god, and

on the other hand the swastika, through the repetition of the same gestures at an angle of

90 deg. to the first. The second figure represents the god whirling round as he comes down to

earth to reorganize the world in chaos

.5 The largest known example is ten metres long. It was brought back by the Dakar-Djibouti

Mission and given to the Musée de l'Homme in Paris, cf. M. Griaule, Masques Dogons,

pp. 234 ff

.6 Thus the Yendoumman Damma niche contains three specimens, the Yendoumman

Banama contains four, the Yendoumman Da, three, the Barna, four, and the Ennguel du

Bas, three. Cf. M. Griaule, Masques Dogons, pp. 24a ff

.7 Ibid., pp. 245 ff

.8 For another index that enables us to establish the minimum age of some of the villages, cf. Griaule, 'Le Verger des Ogol (Soudan français)' Journal de la Société des Africanistes, xvii

pp. 65-79

.9 The Hogon of Sanga, who was enthroned in 1935, was thus the oldest man in the area at that date (i.e. the oldest of the Dyon). If we agree that he was born in about 1855, his

great grandfather, who, he claims, was very old when he himself was a young goatherd, who is probably born between 1770 and 1780

Each fermenting receptacle is evidence of the Sigi for which it was woven and is known as such. This means that these objects form a sequence that is considered by the people to be more than purely numerical.

BO The period indicated by a series of this kind would be 1,440 years by the time the next Sigi came round. It would apparently correspond to the sequence of sixty reigns in which each Hogon appears and which itself covers a period of about 1,500 years. The supreme chiefs of the Arou tribe are in fact chosen when still young, unlike the practice current among the other tribes. The average reign is likely to be twenty-five years.

a 1 Sigo do.o in Bambara

22 For a discussion of this mythical figure, who corresponds to the Bambaras' Mousso Koroni, see later in this article.

23 The po, *Digitaria coilis* is commonly called 'fonio' in West Africa.

24 For a discussion of this mythical figure see later in text.

25 In the song the vowel becomes slightly nasal.

26 The saying that 'if you look at *Digitaria* it's as if the world were spinning (po tolo yenehe aduno gonode ginwo) was probably coined to convey this impression.

27 cf. M. Griaule, 'Signes graphiques des Dogon', in M. Griaule and G. Dieterlen, 'Signes graphiques soudanais', *L'Homme* 3 (Paris, Hermann).

28 In the system of notation based on the figure 80 this number is called '80 and 20'. The period of fifty years is very close to that of Sirius's companion. Cf. P. Baze, *Le Compagnon de Sirius*, *L'Astronomie* (Sept. 1931), p. 385.

29 For a discussion of this principle cf. Griaule, *Dieu d'eau*, pp. 183 ff.

30 After this reform the Hogons' sacrifice was replaced by animal sacrifice.

31 This belief still obtains among the Dogon, and also among many other peoples, cf. Griaule *Jeux Dogons*, *Travaux et Mémoires de l'Institut d'Ethnologie de l'Université de Paris*, vol. xxxii.

32 For a discussion of the symbolism attached to the number 7 cf. Griaule, *Dieu d'eau*, p. 60.

33 The figure 60 is the old base of the system of notation still used in the Sudan for a number of ritual calculations. In several Sudanese languages 60 is known as the 'Mande calculation', because the system is believed to have spread from Mande. Nowadays the various districts use 80 as a base for their calculations. Cf. G. Dieterlen, *Essai sur la religion bambara* (Paris

PUF)

34 There is a contradiction here that has not so far been solved. On the one hand the Dogon accept that Digitaria is in orbit for fifty years and this figure governs the way the Sigu is calculated. On the other hand Sigu is held at sixty year intervals. Nevertheless, it should be noted that the date of the last Sigu which was celebrated at the very beginning of the twentieth century, was allegedly brought forward. Does this indicate that the date was regularly brought forward for each ceremony? The uninitiated would thus be kept going with the idea that the official period was sixty years and that, for accidental reasons, it happened to be reduced to a half-century.

The foregoing myth is given here as an indication of the changes or combinations in the system of computation that occur in the history of the black peoples.

35 po tolo amma tolo la woy manu.

36 According to Innekouzon, po tolo, 'Digitaria star', has a hidden etymological derivation from po:to, 'profound beginning'.

37 See below.

38 The Digitaria seed is made up of four parts, only one of which, the outer casing, has a name koba. The other three are known as yolo.

39 This expression is always being used by Manda, whose extremely punctilious mind thus avoids even mentioning the name of one of the most basic tabus of the totemic priests.

40 For further details cf. Griaule, 'Signes graphiques des Dogons'. See also Griaule, *L'image du monde au Soudan*, *Journal de la Société des Africanistes*, xix, 2, pp. 81-89.

## THE KNOWLEDGE OF THE DOGON

51

41 Cf. below.

42 They are counted clockwise, starting from the highest figure on the right-hand side.

43 This cow is an avatar of the Nommo.

44 It should be remembered that the Dogon, like the other black peoples, use several different symbols or even several different sequences of images to express a single idea or object. Conversely a symbol often represents several different things.

45 The shape of this basket is roughly the same as the outline of a mortar.

46 On the system of symbols represented by this basket.

47 It is understood that Digitaria was the same shape as a basket, but was not a basket.

48 The initiates have a different idea of these dimensions

49 aduno kize fu gwyoy

50 This drawing is executed in Wazouba inside the sanctuaries during the festival of agu

51 kize wogonode para gwdy wokuwogo dega bay tuturu byede

52 po tolo kize woy wo gayle be dedemogo wo sige be,

33 This has the same root as sagatara, 'strong, powerful (native etymology)

54 The number 480 is the product of the base number 80 times the number of tens in the base number 60, which was formerly in use. It is used here to symbolize the largest number of all

55 Versions of, respectively Innekouzou, Manda and Ongnonlou.

56 po tolo aduno fu dudun gowoy

57 The men have two twin souls of different sexes. Cf. Griaule, *Dieu d'eau*, pp. 183 ff. The same idea is current among the Bambara, cf. Dieterlen, *Essai sur la religion Bambara*, chapter 3.

58 The figures reproduced here are used in Wazouba.

59 This figure was taught to Ongnonlou in August 1950, by the Hogon of Sanga.

60 Yourougou, who was born a single being, is fated to pursue the female soul that is his idea, twin to the end of time. In particular he tried to seize it by snatching away from his mother, the Earth, part of the placenta that emerged after he was born, because he thought it was his twin soul.

61 *Vulpes paucida*

62 Cf. Griaule and Dieterlen, *\*Le harpe-luth des Dogon*, *Journ. de la Société des Africanistes*, xx, 2.

63 A man could just as well call it *anam tohu*, 'drawing of men'.

64 *Fin*, from which *fonio*, a word used throughout Sudanese Africa, is derived, is the same word as *po*.

65 The expression may possibly indicate the *Sirius* and *Digitaria* grouping, or *Digitaria* and another companion. For *Faro*, or *Fanro*, the Bambara equivalent of the Dogon *Nommo*, cf. Dieterlen, *Essai sur la religion Bambara*, chapters 1 and 2.

66 Cf. *ibid.*, chapter 1. This refers to a future world that will be heralded by flood-waters.

67 The *koso wata* blanket, which is worn by elderly initiates at the major Bambara institutions.

(dye), belongs to a series of eight ritual blankets with patterns and colours representing mythology, cosmology and the social structure. They are used at night or worn as clothing, depending on the status, duties and aims of the wearer. Apart from their economic value, they are evidence of the wearer's knowledge. Their ritual use is plain, particularly during marriage ceremonies. The Dogon have similar blankets. The one known as *yanina* represents a sort of very rough map of the world showing the most important stars.

For a discussion of the way the Bambara and Dogon set great store by weaving and the various cotton strips, cf. Dieterlen, *Essai*, chapter 5, and Griaule, *Dieu d'eau*.

68 For a discussion of the parallels between Mouso Koroni Koinde and Yasigi, cf. Dieterlen, *Essai*, chapter 1. For a discussion of Mouso Koroni Koinde, Pemba and Faro, cf. S. de Ganay, 'Aspect de mythologie et de symbolique bambara', *Journal de psychologie normale et pathologique* (April/June 1949); Dieterlen, *Essai*, chapters 1 and 2.

## The Sirius Question is Rephrased

### INTRODUCTION

We shall turn now to the star Sirius in history. What was its importance, if any, in ancient religions? Is there evidence from the ancient cultures that the mysterious details of the Sirius system were known to others than the Dogon tribe? And can we discover where the Dogon got their information?

I must warn the reader that Part Two is difficult, by the nature of its subject matter. I have tried to make it readable, but beg the reader's indulgence if I have not succeeded. It is exciting material and the reader should stick with it. I am certain he will come out at the end of the tunnel with a great deal of amazement. For the ancient cultures are far more bizarre than the ordinary person is generally led to expect.

### A Fairytale

Once there was a beautiful bright star named Sothis, as fine as any goddess. She had long held a dominant position in the sky and been admired by all for her beauty. But of late she had felt unwell, indeed, it distinctly seemed to her that she felt her life ebbing away. Night by night she fell further from her high, proud place in the sky—closer to the skyline and what must surely be her certain death. Falling, falling, she clung to any companion star she could find, only to discover that they too felt this deathly weakness, and were sinking into a kind of sweet sleep. What was she to do? She felt her strength going nightly—she could hardly shine the way she wished. Once she had been as glamorous, as scintillating a queen of the night sky as ever had been seen. And now she felt she was as worthless as any old woman, her position at the

centre of things gone, and her beauty fading steadily. Towards the end she wept bitterly and her eyes reddened with the shame of her coming eclipse. She was so ill, her discomfort so acute. She was almost glad to welcome her fate, and that terrible time of earth and hills which she had dreaded, at last devoured her brilliant presence entirely. The night came and she was no more. Beneath the earth she rested in the balm of death.

But because this queen of the sky had been good during her ascendancy and had not been too haughty or vulgar, there were many admirers of her beauty to mourn her passing. Down on the lowly earth moved less brilliant mortals. Many nights they had stood in awe of the beautiful Sothis when she was in her prime. Some, indeed, had watched her birth when, red as a baby from the womb or as the Sun when he rises daily, this bright and beautiful immortal (or so she had seemed) had first flashed the most piercing and glittering rays of her incomparable presence sideways across the earth, seeming almost to scorch the very ground with her flaming beauty. This first appearance had been brief, for immediately behind her had come the all-engrossing grandeur of the great Sun himself. Heedless of Sothis, he soon washed the sky white with his splendour. All the stars dissolved like tiny drops of milk, lost when their bowl is suddenly filled to overflowing. So great was the Sun, so irresistible his presence. He whom some compared to a great wild bull bellying and lording it over the heavens and the earth alike. But every night the Sun retired to his resting place, and night by night the flaming goddess Sothis entranced and bewitched mortal men, as she rose steadily higher and grew to great perfection. And further and further ahead of the Sun she rose each night.

But with her absence, how barren, how bleak, the sky now seemed. The disappearance of this renowned beauty from the vault of the heavens seemed such an unbearable deprivation. How the goddess was missed! Many mortal men shed bitter tears not to see the beauty who had infatuated them with her glancing eyes, her winsome smile, her slim waist and delicate feet. Were they never again to see her light tread in the celestial round dance of the stars?

Day followed night, and the sorrow of many became soothed by time's healing wings, which slowly fold themselves around the sufferer in invisible layers of sleep, forgetfulness, and the new interests which life must bring. The beautiful Sothis, though mourned, was lost only to the sight. For all remembered her, and that image of her burned into memory was so glorious, that to expect her actual presence came to seem almost too much to ask of many. Hued, shifting, and various Fate.

Seventy days had elapsed. Hope had long since been abandoned to acceptance, sorrow had become numb. A shepherd had gone out before sunrise to his lambs now fully six months old. The Sun would not long be delayed, it

was approaching the time of daybreak. The shepherd looked towards the skyline in the east. And as he looked, he saw the horizon burn with a refrigent fire, and the shimmering red birth of the goddess. It was she, it must be she. No other star had that aura, such a penetrating persona. The shepherd stood transfixed, his eyes were seared by this fresh star, dripping it seemed, with the waters of life, and aflame also with the fiery resurgence of its renewed existence. As the quick Sun behind her moved up to erase Sothis's tantalizingly brief appearance, the shepherd turned and ran to the nearest settlement. 'Awake! Awake! The goddess has returned. She is reborn, immortal, come back from death!' And all the devotees assembled with excitement and renewed hope. They heard the tale, saw for themselves the next morning, and they instituted a yearly celebration. This celebration exists to this day, and many are the temples, many are the priests, who gather in the month of July throughout all our land of Egypt to witness the much heralded yearly rebirth of the great Sothis, Mother Isis, bestower of concord and blessings to her people. And in honour of her seventy days spent in the underworld, we have instituted the seventy-day embalming and mummification rites for our own dead, as it is pious and indeed right that we should do.

I wrote this fairytale, from the point of view of an ancient Egyptian priest, in order to convey to the reader not only certain facts but also certain equally important and, unfortunately, extinct emotions. For the attitudes and feelings of ancient peoples are just as important as the dry description of what facts they believed.

Sothis was the ancient Egyptian name for Sirius as it was spelt by the Greeks. The Egyptians had a Sothic calendar and the first appearance of Sirius on the eastern horizon just before the sun after 70 days in the Duat (Underworld) was what is called the heliacal rising (or 'with-the-sun' rising) of Sirius. This event occurred once a year and gave rise to the Sothic Calendar whose details we need not go into.





Figure 14 The heliacal rising of Sirius Dogon drawing of Sirius and the sun joined together at this moment

The heliacal rising of Sirius was so important to the ancient Egyptians (as

Indeed it is to the Dogon as well<sup>11</sup>) that gigantic temples were constructed with

their main aisles oriented precisely towards the spot on the horizon where Sirius would appear on the expected morning. The light of Sirius would be channeled along the corridor (due to the precise orientation) to flood the altar in the inner sanctum as if a pin-pointed spotlight had been switched on. This

[blast of light focused from a single star was possible because of the orientation being so incredibly precise and because the temple would be otherwise in total darkness within. In a huge, utterly dark temple, the light of one star focused solely on the altar must have made quite an impact on those present. In this way was the presence of the star made manifest within its temple. One such temple to the star Sirius was the temple of Isis at Denderah. An ancient hieroglyphic inscription from that temple informs us 2

She shines into her temple on New Year's Day, and she mingles her light  
with that of her father Ra on the horizon

(Ra is an ancient Egyptian name for the sun.)

The heliacal rising of Sirius was also important to other ancient peoples. Here is a dramatic description by the ancient Greek poet Aratus of Soli of the rising of Sirius<sup>3</sup> (often known as the Dog Star as it is in the constellation Canis, or 'Dog')

The tip of his [the Dog's] terrible jaw is marked by a star that keenest of  
all blazes with a searing flame and him men call Sirius. When he rises  
with the Sun [his heliacal rising] no longer do the trees deceive him by the  
feeble freshness of their leaves. For easily with his keen glance he pierces  
their ranks, and to some he gives strength but of others he blights the bark  
utterly.

We see that this dramatic description of the rising of the star indicates an event which was certainly noticed by ancient peoples. Throughout Latin literature there are many references to 'the Dog Days' which followed the heliacal rising of Sirius in the summer. These hot, parched days were thought by that time to derive some of their ferocity and dryness from the 'searing' of Sirius. Traditions arose of Sirius being 'red' because it was in fact red at its heliacal rising, just as any other body at the horizon is red. When making rhetorical allusion to the Dog Days, the Latins would often speak of Sirius being red at that time, which it was.

We tend to be unaware that stars rise and set at all. This is not entirely due to our living in cities ablaze with electric lights which reflect back at us from our fumes, smoke, and artificial haze. When I discussed the stars with a well-known naturalist, I was surprised to learn that even a man such as he, who has spent his entire lifetime observing wildlife and nature, was totally unaware of the movements of the stars. And he is no prisoner of smog-bound cities. He had no inkling, for instance, that the Little Bear could serve as a reliable night clock as it revolves in tight circles around the Pole Star (and acts as a celestial hour-hand at half speed—that is, it takes 24 hours rather

than 12 for a single revolution)

I wondered what could be wrong. Our modern civilization does not ignore the stars only because most of us can no longer see them. There are definitely deeper reasons. For even if we leave the sulphurous vapours of our Gomorrah's to venture into a natural landscape, the stars do not enter into any of our back-to-nature schemes. They simply have no place in our outlook any more. We look at them, our heads flung back in awe and wonder that they can exist in such profusion. But that is as far as it goes, except for the poets. This is simply a 'gee whizz' reaction. The rise in interest in astrology today does not result in much actual star-gazing. And as for the space programme's impact on our view of the sky, many people will attentively follow the motions of a visible satellite against a backdrop of stars whose positions are absolutely meaningless to them. The ancient mythological figures sketched in the sky were taught us as children to be quaint 'shepherds' fantasies' unworthy of the attention of adult minds. We are interested in the satellite because we made it,

## A FAIRYTALE

59

but the stars are alien and untouched by human hands, therefore vapid. To such a level has our technological mania, like a bacterial solution in which we have been stewed from birth, reduced us

It is only the integral part of the landscape which can relate to the stars. Man has ceased to be that. He inhabits a world which is more and more his own fantasy. Farmers relate to the skies, as well as sailors, camel caravans, and aerial navigators. For theirs are all integral functions involving the fundamental principle - now all but forgotten - of orientation. But in an almost totally secular and artificial world, orientation is thought to be unnecessary. And the numbers of people in insane asylums or living at home doped on tranquilizers testifies to our aimless, drifting metaphysics. And to our having forgotten orientation either to seasons (except to turn on the air conditioning if we sweat or the heating system if we shiver) or to direction (our one token acceptance of cosmic direction being the wearing of sun-glasses because the sun is 'over there').

We have debased what was once the integral nature of life channelled by cosmic orientations - a wholeness - to the enervated tepidity of skin sensations and retinal discomfort. Our interior body clocks, known as circadian rhythms, continue to operate inside us, but find no contact with the outside world. They therefore become ingrown and frustrated cycles which never interlock with our environment. We are causing ourselves to become meaningless body machines programmed to what looks, in its isolation, to be an arbitrary set of cycles. But by tearing ourselves from our context, like the still-beating heart ripped out of the body of an Aztec victim, we inevitably do violence to our psyches. I would call the new disease, with its side effect of 'alienation of the young', dementia temporalis.

When I tried to remedy my own total ignorance of this subject originally

I found it an extremely difficult process. I discovered that I was reading coherent explanatory matter which I 'understood' but did not comprehend. For comprehension consists of understanding from the inside as well as under-

standing from the outside. Things that do not really matter to us, or into which we do not imaginatively project our own consciousness, remain strange to us, we understand them outside (like a man feeling the skin of an orange) but we have no inherent relation with the thing, and hence are ultimately divorced from its reality. This increasing isolation and alienation, a cultural blight of which there is almost universal complaint in the 'civilized' world, is yet another

consequence of dementia temporalis. For how can you get inside anything in the end if you have ceased to be inside your own local universe with its cycles and natural events? To be outside nature is to be an outsider in all things.

With these observations in mind and a child's fairytale to help guide us into the anteroom of the Egyptian psyche, let us prepare to take a plunge over a

waterfall in the certainty that there is no chance of drowning. I have been over this particular waterfall before, and I assure you that the thrill is absolutely delicious if you just let yourself go. But there is no question about the fact that we'll have to swim pretty hard. We're off — and immediately we are in the frothing rapids where names and basic guidelines must be established quickly. Professors Parker and Neugebauer, who are experts in such matters as these, tell us 4



Figure 14. A star map showing the constellations Orion, Lepus (The Hare), Canis Major (the Great Dog) which contains the 'Dog Star, Sirius' and the huge constellation Argo (the Ship). The arrangement of the stars in Argo has been altered somewhat in this star map by the author and cartographer, which is not unusual since Argo is so large and sprawling that it can rarely if ever be found on a single detailed star map. One can draw a ship almost any way one wants for Argo and still be 'within the rules'. Notice that Orion stands on the hare, which is portrayed in the Greek vase painting in Plate 19.

The Egyptian calendar year on which the diagonal star clocks (hitherto called 'diagonal calendars') were constructed is the well-known civil or 'wandering' year which consisted of twelve months of three 10-day weeks, divided into three seasons of four months each, followed by five epagomenal days, called by the Egyptians 'the days upon the year'. The total of 365 days did not vary and as a consequence the Egyptian year moved slowly forward in the natural year by, on the average, one day in four years. As

we shall see later this was a continuously vexing complication in keeping the star clocks adjusted.

The basis of these clocks was the risings of the stars (conventionally referred to as 'decans') at twelve 'hour' intervals through the night and in 30-day weeks through the year.

The main star or decan was Sirius. The four decans immediately before it in order comprise the constellation Orion. The last portion of Orion rises above the horizon one 'hour' before Sirius. It was for this reason that Orion took on significance in the Egyptian mythology and religion. The Egyptians were so concerned with Sirius, the star whose rising formed the basis of their entire calendar, that the decan immediately preceding it came to be looked on as Sirius's 'advance man'. Sirius itself was known to the Egyptians as Spd or Spdt (a 't' ending is feminine). This is sometimes spelt Sept and pronounced thus. Orion was known to the Egyptians as Ssh which is transliterated as Sah or Sah, and pronounced thus.

Now that we have established a few names and facts, we have to consider the next fundamental point. We must establish, on the professors' word for it, that the star Sirius was actually identified with the famous goddess Isis, the head of the Egyptian pantheon. This will be a major breakthrough in our search for understanding. We must be careful not to be just saying things without evidence. The most common and most offensive characteristic of previous books about 'visiting spacemen' has often been the impossibility of checking any of their statements about ancient cultures (aside from the many obvious errors). Sometimes there are even references to newspaper articles which never existed, or to mysterious professors behind the Iron Curtain who have gone into hiding, taking their unpublished manuscripts with them. There are some such writers who claim that mysterious hierarchies of 'initiates' exist, some of them residing in secret caves deep in the centres of mountains, and some of these 'initiates' are directly in touch with and take their orders from 'flying saucers'!

Now on to the Egyptians. The heliacal rising of Sirius is called in Egyptian prt Spdt. Neugebauer and Parker say: "We offer the suggestion that Spdt was in origin a mishe of spd referring to Isis as 'the one of Spd'." That spd and spdt Sothis are both identified with Sirius is one of the rare certainties in Egyptian astronomy. Sothis is a goddess firmly identified with Spdt and residing there. Sothis is also identified with the goddess known to us as Isis but whose Egyptian name is ast which is transliterated as Ast.

Professor Wallis Budge makes this interesting observation: "The throne or

seat,  , is the first sign in the name of Ast- , who is the female



without the addition of any name. No other god of the Egyptians was ever mentioned or alluded to in this manner, and no other god at any time in Egypt ever occupied exactly the same exalted position in their minds, or was thought to possess his peculiar attributes. He adds 8 "The plaque of Hemaka proves that a centre of the Osiris cult existed at Abydos under the 1st Dynasty but we are not justified in assuming that the god was first worshipped there, and it is difficult not to think that even under the 1st Dynasty shrines had been built in honour of Osiris at several places in Egypt."\*

\* Emery estimates the First Dynasty as commencing around 3200 B.C.

## A FAIRYTALE

6.3

Thus we see the immense antiquity of the recognition of Ast and Asar (Isis and Osiris), going back well before the dynastic period in Egypt.

Wallis Budge says 9 "The symbol of Isis in the heavens was the star Sept.

which was greatly beloved because its appearance marked not only the beginning of a new year, but also announced the advance of the Inundation of the Nile, which betokened renewed wealth and prosperity of the country. As such Isis was regarded as the companion of Osiris, whose soul dwelt in the star Sah,

i.e. Orion."

Wallis Budge also says 10

Notwithstanding the fact that As, or Ast, i.e. Isis, is one of the goddesses most frequently mentioned in the hieroglyphic texts, nothing is known with certainty about the attributes which were ascribed to her in the earliest times. The name Ast has, like Asar, up to the present defied all explanation, and it is clear from the punning derivations to which the Egyptians themselves had recourse, that they knew no more about the meaning of her name than we do. The symbol of the name of Isis in Egyptian is a seat, or

throne, , but we have no means of connecting it with the attributes

of the goddess in such a way as to give a rational explanation of her name, and all the derivations hitherto proposed must be regarded as mere guesses.

An examination of the texts of all periods proves that Isis always held in the minds of the Egyptians a position which was entirely different from that of every other goddess, and although it is certain that their views concerning her varied from time to time, and that certain aspects or phases of the goddess were worshipped more generally at one period than at another it is correct to say that from the earliest to the latest dynasties Isis was the greatest goddess of Egypt. Long before the copies of the Pyramid Texts which



we possess\* were written the attributes of Isis were well defined, and even when the priests of Heliopolis assigned her the position which she held in the cycle of their gods between b.c. 4000 and b.c. 3000 the duties which she was thought to perform in connexion with the dead were clearly defined, and were identical with those which belonged to her in the Graeco-Roman period.

I had begun to suspect that the sister-goddess of Isis, who is called Nepthys, represented a possible description of Sirius B, the dark companion star that described a circle around Sirius (For we have just seen that Isis was identified with Sirius quite precisely by the Egyptians, a fact which no Egyptologist would ever dream of disputing, as it is quite undeniably established as we have

• Wallis Budge believes those of the Vth and Vth Dynasties to be copies of earlier writings including those of the 1st Dynasty; see p. 117 of his book

seen ) But I must confess that I was not prepared to discover this following passage 11

On the subject of Anubis Plutarch reports (44-61) some interesting beliefs. After referring to the view that Anubis was born of Nepthys, although Isis was his reputed mother, he goes on to say, 'By Anubis they understand the horizontal circle, which divides the invisible part of the world, which they call Nepthys, from the visible, to which they give the name of Isis, and as this circle equally touches upon the confines of both light and darkness, it may be looked upon as common to them both - and from this circumstance arose that resemblance, which they imagine between Anubis and the Dog, it being observed of this animal, that he is equally watchful as well by day as night.'

This description could be taken to be one of the Sirius system. It clearly describes Isis (whom we know to have been identified with Sirius) as 'the confines of light' and 'the visible', and her sister Nepthys is described as being 'the confines of darkness' and 'the invisible', and common to both is the horizontal circle which divides them - the horizontal circle described, perhaps, by the orbit of the dark companion about the bright star? And here, too, is an explanation of the symbolism of the dog which has always been associated with Sirius, which has borne throughout the ages the name of the 'Dog Star'.

Anubis is variously represented as jackal-headed and dog-headed in Egyptian art. Wallis Budge adds 12 'Thus much, however, is certain, that in ancient times the Egyptians paid the greatest reverence and honour to the Dog.' "

Anubis was also variously represented as the son of Nepthys by Osiris.

and as being really identical with Osiris himself. A famous tale has him embalm the corpse of Osiris. Osiris was known as Anubis, though, at Oxyrhynchus and Cynopolis.<sup>13</sup>

A name similar to Anubis (which is really Anpu in Egyptian) and which is also associated with Isis-Sothis (Sirius), is Anukis, a fellow goddess of Sothis who, along with the goddess Sais, sails in the same celestial boat with Sothis in the Egyptian paintings. There are thus the three goddesses together, possibly a description of Sirius A, Sirius B, and Sirius C, and emphasizing that the Sirius system is really thought to be a three-star system. Just to underline the point, Neugebauer specifically states<sup>14</sup> 'The goddess Sais, who like her companion Anukis is hardly to be taken as a separate constellation but rather as an associate of Sothis.

The goddess Anukis holds two jars from which she pours water, possibly indicating two watery planets around her star? All the references to the Sothic heavens are to a watery, reed-growing paradise. Many archaeologists have surmised that this refers to some specifically Egyptian locale. But no one is sure. What is known is that heaven is almost invariably associated with the Sirius system and is described as being prolific of vegetation and watery.

In Plutarch's famous and lengthy treatise (from his immense work the *Moralia*, which is even longer than his *Lives*), 'Isis and Osiris' (356) we read 'Isis was born in the regions that are ever moist'. In the Loeb Library edition of this, the translator F. C. Babbitt adds a footnote at this point saying 'The meaning is doubtful.' In other words, no one is really sure what is

## A FAIRYTALE

65

meant by all these references to Isis-Sothis and the 'moist regions', which are supposed by most scholars quite sensibly to be projections of local Egyptian conditions around the Nile into an ideal celestial region. But most scholars admit that this is mere conjecture. The 'moist regions' could just as well be an attempt to describe some watery planets.

It is worth pointing out that in the event of planets in the Sirius system being watery, we must seriously consider the possibility of intelligent beings from there being amphibious. This ties in with the legend of Oannes which I mentioned in Part One. He was the amphibious being mentioned by the astronomer Carl Sagan from the Sumerian tradition, and was the bringer of civilization to man. In other words, beings of this type would be a bit like mermaids and mermen and might in some way resemble our intelligent friends the dolphins. I discuss this subject further in Part Three of this book.

Perhaps the sirens are, figuratively, a chorus of mermaids recalled from earlier times. By coincidence, in zoology a siren is 'one of a genus (*Siren*) of eel-shaped amphibians having small forelimbs, but destitute of hind legs and pelvis, and having permanent external gills as well as lungs. It would be interesting to

see how far back in time these creatures were called by their name. As for the singing sirens who lure sailors to the rocks, they are called in Greek *Seiren* (singular), *Seirenes* (plural) and are first mentioned in Homer's *Odyssey*. Homer knew of two sirens, but later there was a third, and some added a fourth. (Plato decided there were eight because of that number matching the number of musical notes in the octave.) It is interesting that in Greek *Sirius* is *Seirios*. Liddell and Scott in their definitive Greek lexicon give a meaning of the previous *Seiren* as 'a constellation, like *Seirios*, Eust. 1709. 54'.

Another similar word *Seistron* became in Latin *sistrum* and Liddell and Scott define it as 'A rattle used in the worship of Isis, '.

Let us now turn our attention to a remarkable book, *Star Names, Their Lore and Meaning* by Richard Hinckley Allen. In this book, under a discussion of the constellation *Canis Major* (The Dog), which contains *Sirius*, 15 on p. 130, in a description of the star of the constellation represented by the Greek letter  $\delta$  (delta)

It is the modern *Wezen*, from (the Arabic) *A. Wazn*, *Weight*, "as the star seems to rise with difficulty from the horizon," but Ideler calls this an astonishing star name '.

Yes, concerning what we know, it is astonishing.

Before leaving the star, it is worth noting that Allen says the Chinese knew it is well as some stars in *Argo* as 'Hoo She, the Bow and Arrow', and that the bow and arrow is a variation motif associated with the *Sirius* system by the Egyptians. In Neugebauer we read: 16 'The goddess *Satis*, who like her companion *Anukis* is hardly to be taken as a separate constellation but rather as an associate of *Sothis*. In *Dendera B*, the goddess holds a drawn bow and arrow.

More information regarding *Al Wazn*, 'Weight', is found in Dr. Christian Ludwig Ideler's *Untersuchungen ueber den Ursprung und die Bedeutung der Sternnamen* Berlin, 1809, which Allen describes as 'the main critical compendium of information on stellar names. Arabic, Greek, and Latin especially. It is to him that we owe the translation of the original Arabic text of Kazwini's *Inscription of the Constellations*, written in the 13th century, which forms the

## THE SIRIUS MYSTERY

basis of the *Sternnamen*, with Ideler's additions and annotations from classical and other sources. From this much information in my book is derived '.

Ideler might well comment that *A. Wazn* is 'an astonishing star name'. To

call a star in the same constellation as Sirius 'too heavy to rise over the horizon with ease' looks suspiciously like an attempt to describe a 'heavy star' such as

## Sirius B

Could this reference to a 'heavy star' be a reference to Sirius B by people who have inherited a slightly garbled version of the tradition of its being a super-dense star invisible to the unaided eye - resulting in their seizing on one of Sirius's apparent companions (as seen from the Earth) and giving it a description properly applying to its actual companion? The Arabs do not mention '480 ass loads' to describe its weight in the quaint fashion of the Dogon but the substance of the idea seems to be present. It is well known that ancient Arabic astronomical lore derives from Egypt and is found in Arabic traditions in a degenerate form. Obviously the search must now be on for this concept of a super-heavy star in Egyptian traditions! I had always suspected that this most secret tradition of the Dogon reached them from Egypt, just as the lore of stars reached the Arabs from Egypt. It will not be easy for us to discover, as it must have been an extremely esoteric and secret teaching of the Egyptians, just as it was the most secret teaching of the Dogon.

A further use of the name Wazn is its loose application to the star Canopus in the constellation Argo. 17 Allen, in describing the Argo, quotes the ancient Greek poet Aratos, in a passage showing us something of the relation Argo bears to Canis Major, the Great Dog

Sternforward Argo by the Great Dog's tail.  
Is drawn

Argo is the constellation representing both Jason's ship with its fifty Argonauts and Noah's ark

Jason's Argo 'carried Danaos with his fifty daughters from Egypt to Rhodes', as Allen puts it. He adds 'The Egyptian story said that it was the ark that bore Isis and Osiris over the deluge; while the Hindus thought that it performed the same office for their equivalent Isi and Iswara.

Allen's old-fashioned spelling Iswara is a reference to the word Ishvara. There are some interesting facts to be gleaned from perusing the meanings of the Sanskrit word ishṭi, which basically means 'an arrow'. Recall the connection of the bow and arrow with Sirius among both the Egyptians and the Chinese. (Further examples are given in the book Hamlet's Mill, along with interesting illustrations.) Now note from Monier Williams's definitive Sanskrit dictionary that ishṭi means not only 'arrow' but 'ray of light'. Ishvasa means 'a bow' or 'an archer'. Remember the three goddesses and note this: that Ishustrikanda, which literally means 'the threefold arrow', is specifically meant to be the name of a constellation! Monier Williams says it is 'perhaps the girdle of Orion' (which has three prominent stars). The interested reader must refer to Hamlet's Mill by Santillana and von Dechend for a great deal of discussion of Sirius the Bow Star.

But to return to the celestial Argo-boat (or ark); we have previously encountered this Egyptian idea of the celestial boats in which their gods sailed

## A FAIRYTALE

67

through the waters of the heavens. The three Sirius-goddesses Sothis, Anukis, and Satis, were all in the same boat. So it is interesting to see that Argo was a boat connected with Isis and Osiris, for a concept which seems to be peculiarly stubborn in attaching itself to Argo is the number fifty. It is my suspicion that this is a remnant of the concept of Sirius B taking fifty years to complete an orbit around Sirius A. This suggestion is not as far-fetched as it may seem at first sight. Indeed, the reader will discover as he proceeds that the suggestion will become more and more obvious. We must realize that in Egyptian terms the orbit of Sirius B around Sirius A could have been expressed in terms of a celestial boat. Now since Argo is the boat of Isis and Osiris, what better way to express the fifty-year orbit than by giving the boat fifty oarsmen? And that is what Argo has—in the tradition there are fifty rowers, or Argonauts.

In order to fortify my argument I shall quote Allen's precise way of describing this 18. 'Mythology insisted that it was built by Glaucus, or by Argos, for Jason, leader of the fifty Argonauts, whose number equaled that of the oars of the ship.' " In other words, it is not the men but the number of oars laid out in line round the ship that is important. A ship (an orbit) with fifty oars (fifty 'markers' or yearly stages). And just so that we don't miss the importance of the figure fifty, we are told there were fifty daughters of Danaus transported from Egypt on the Argo! (Readers who wonder what other connection there may be between the Argo of the Greeks and ancient Egypt must be patient.) Argo is therefore totally involved in the picture, as we now see. There are many further ramifications of this, not only of Argo, but of the number fifty.

But before moving on to what that entails, it is worth giving an illustration of the concept of 'the rower' in the celestial barque from an ancient Egyptian coffin text 'The Field of Paradise'.<sup>19</sup> It is quite likely that from concepts such as these the idea of a rower and his oar developed and became incorporated in the Argo myth and came to be symbolic. '...in the place where Re (the Sun) sails with rowing. I am the keeper of the haryard in the boat of the god; I am the oarsman who does not weary in the barque of Re.' (Re is another form of the more familiar Ra.)

The first person in this text refers to the deceased Pharaoh. This is one of the examples of the common Egyptian conception that when a Pharaoh died he became a celestial rower. It should be obvious, then, how the concept of 'fifty rowers' by fifty positions, or oars, came to be important as symbols. It harks back to this Egyptian motif.

Now we must turn to the Sumerian civilization (which later developed into the Babylonian civilization). We shall be back in Egypt soon enough, with more Argo material. But we must go east. Sumer-Akkad was roughly contemporaneous with ancient Egypt, and the lands are known to have been in

contact In a major source we read<sup>20</sup> of the Sumerian word Magan. 'The land Magan is usually identified either with Arabia or with Egypt'

But whatever contact the two civilizations may have had, we must first investigate the Sumerian religion and mythology For this we rely primarily on the excellent work of Samuel Noah Kramer of the University of Pennsylvania The Sumerian heaven-god is called Anu (In Sanskrit anupa means a watery country) I had a considerable shock when I discovered that Alexander Heidel says in The Babylonian Genesis just as the departed spirits of

68

## THE SIRIUS MYSTERY

Enki and Anu were pictured as the wild ass and the jackal, respectively <sup>21</sup> Anu is represented by the jackal Well, of course, the jackal is the symbol (interchangeable with the dog) of the Egyptian Anpu (Anubis)<sup>1</sup>

I shall explain later why I consider Anu to be related to the Sirius question, apart from this obvious parallel At the moment I shall deal with further related parallels which I consider amazing Anu is the king of some attendant deities called the Anunnaki We shall shortly see why they are so involved in the Sirius question But note the recurrence in Sumer of 'Anu' in both Anu and the Anunnaki, and in Egypt with both Anpu (Anubis) and Anukis In all these cases Sirius is involved Even the jackal or dog is common as a symbol to the 'Anu' in both countries There are other parallels, but we shall come to them in due course

In Sumerian the word an means 'heaven' and Anu is the god of heaven

Wallis Budge says<sup>22</sup> that the Egyptian god Nu was often identified with Nut, which is 'heaven'

Significantly, he expressly states <sup>23</sup>

It is surprising therefore to find so much similarity existing between the primeval gods of Sumer and those of Egypt, especially as the resemblance cannot be the result of borrowing It is out of the question to assume that Ashur-banipal's editors borrowed the system from Egypt, or that the literary men of the time of Seti I borrowed their ideas from the literati of Babylonia or Assyria, and we are therefore driven to the conclusion that both the Sumerians and the early Egyptians derived their primeval gods from some common but exceedingly ancient source The similarity between the two companies of gods seems to be too close to be accidental it is certain that the company of primeval gods was quite different from those which formed in Babylonia and Assyria when these countries were inhabited

by Semitic populations

I had come to all these conclusions myself before seeing this passage by Wallis Budge

But to return to Anu Osiris is sometimes known as An.2\* In a hymn to Osiris<sup>25</sup> he is called the 'god An of millions of years' and also 'An in An-tes, Great One, Heru khuti, thou stridest over heaven with long strides' Therefore this designation as An is specifically connected with heaven and the long strides mean heavenly motion.

In considering An and Anu we must look again at Anubis. But as we do so we shall take a glance at the Sanskrit. Recall that Anubis in Plutarch's account seemed to refer specifically to the orbit of Sirius B. In Sanskrit the word anda means 'ellipse', and the word anu means 'minute, atomic, "the subtle one" an atom of matter' and animan means 'minuteness, atomic nature, the smallest particle, the superhuman power of becoming as small as an atom'. The first word could describe an orbit. Since Kepler we have known that our planets move in elliptical orbits rather than circular ones, and the orbit of Sirius B is that of an ellipse. As for the next two forms anu and animan, they seem to have meanings perilously peripheral to an account of that level of matter (the atomic) where the nature of Sirius B is manifested. We shall see much later in the book that other similarities exist between certain Sanskrit terms relevant to the Sirius

## A FAIRYTALE

69

question and like terms in Egypt and the Near East. But we shall leave those philological matters until later, when they will be shown to have considerable importance.

Back to Anubis. Wallis Budge says of him <sup>28</sup> His worship is very ancient, and there is no doubt that even in the earliest times his cult was general in Egypt; it is probable that it is older than that of Osiris.' Also he points out here, as elsewhere, that the face of the deceased human becomes identified with Anubis, and it is just the head of Anubis which is symbolically represented by the jackal or dog. I have already pointed out that he is described as the circle or orbit separating the dark Nephthys from the light Isis or Sirius. In other words, I take Anubis to represent the orbit of Sirius B around Sirius A. We also find him described as 'time', <sup>27</sup> a particularly intelligent way of looking at an orbit as progressive and sequential in time. 'Time the devourer' a motif common to us all is no stranger to the Egyptians. It should not surprise us that Anubis is also represented as a devourer. More specifically he is accused of devouring the Apis bull. The Apis bull is the animal into which the dead Osiris was sewn and transported, according to a late legend which is widely known. But more basically the 'Apis Bull' (the deity known under the Ptolemies as Serapis) is Asar Hapi. It is Osiris himself. In *The Gods of the Egyptians*, we read 'Apis is called "the life of Osiris, the lord of heaven" and 'Apis was, in fact, believed to be animated by the soul of Osiris, and to be Osiris incarnate'. <sup>28</sup> So, consequently, when Anubis (devoured Apis, he was eating the husband of

Isis! It is very colourfully represented in these dramatic mythological terms, but the meaning is clear. We read later:29

'Others again are of the opinion that by Anubis is meant Time, and that his denomination of Kuon [the Greek word for 'dog'] does not so much allude to any likeness which he has to the dog though this be the general rendering of the word, as to that other significance of the term taken from breeding, because Time begets all things out of itself, bearing them within itself, as it were in a womb. But this is one of those secret doctrines which are more fully made known to those who are initiated into the worship of Anubis.

Exactly. A secret doctrine! What one would give for a fuller account!

This is the trouble with most of our sources: they give away little except by inference. Secret doctrines are not scribbled down too frequently and left for posterity. The most secret doctrine of the Dogon was only revealed with great reluctance after many, many years, and following upon a conference by the Initiates. The Egyptians were no fools, and we can hardly expect them to have left papyri or texts specifically revealing in so many words what they were not supposed to reveal. We can only try to piece together clues. But we will see our clues eventually turn into a veritable avalanche.

The last passage from Wallis Budge was a quotation by him from Plutarch's *Isis and Osiris*. Many Egyptologists have remarked on the irony that we have nowhere in Egyptian sources a full, coherent account of Isis and Osiris, not even in all the sources put together! And we are forced to rely on Plutarch, who did preserve a long account which he wrote in his native Greek. Plutarch is thought to have been a priest himself, and was certainly a Delphic initiate.

He had a talent for befriending priests and priestesses. One of his best friends was the priestess Clea of the oracle at Delphi. His treatise *'Isis and Osiris'* is dedicated to Clea and addressed to her. It begins with these words: 'All good things, my dear Clea, sensible men must ask from the gods; and especially do we pray that from those mighty gods we may, in our quest, gain a knowledge of themselves, so far as such a thing is attainable by men.' This gives some indication of what Plutarch was like as a man.

The Introduction to the Loeb edition of *Isis and Osiris* by F. C. Babbitt says: '[Plutarch] once visited Egypt, but how long he stayed and how much he learned we have no means of knowing. It is most likely that his treatise represents the knowledge current in his day, derived, no doubt, from two sources: books and priests. It is certain that Plutarch's friend Clea, who was so important at Delphi, would have seen to it that Plutarch had ample introductions to leading priests of Egypt. This sort of thing was standard practice, as with the study of



Egyptian religion and astronomy undertaken centuries earlier by the Greek scholar Eudoxus (colleague of Plato and Aristotle), who was given a letter of introduction to the last of the native Pharaohs, Nectanebo, by the Spartan general Agesilaus, and who in turn sent him off to associate with his priests. The fact that Plutarch's treatise is addressed to Clea may indicate a debt to her for its preparation as well as common religious enthusiasms. So, no doubt Plutarch did with the Egyptian priests what Griaule and Dieterlen did with the Dogon – drew some secret traditions out of them. It is thus not surprising that Plutarch's essay is more respected by Egyptologists than by classicists.

Plutarch says: 'Some are of the opinion that Anubis is Cronos'30 Chronos, of course, was the Greek 'time the devourer', spelt with an h. Cronos in Latin is Saturn. There is a considerable debate among scholars whether Cronos (Saturn), the former chief god prior to Zeus (Jupiter), has any definite relation to the word chronos spelt with the h and sometimes used as a proper name for Time. From this latter word we derive chronology, chronicle, etc. The Sumerian god Anu is quite similar to the Greek Cronos because both Cronos and Anu were 'old' gods who were displaced by younger blood – by Zeus and Enlil respectively. Thus another possible link between Anu and Anubis, if one be willing to grant that Cronos and Chronos are not entirely separate words and concepts in ancient pre-classical Greece.

Walton Budge continues with reference to Plutarch:

Referring to Osiris as the 'common Reason which pervades both the superior and inferior regions of the universe', he [Plutarch] says that it is, moreover called 'Anubis, and sometimes likewise Hermanubis (i.e. Heru-em Anpu), the first of these names expressing the relation it has to the superior, as the latter, to the inferior world. And for this reason it is, they sacrifice to him two Cocks, the one white, as a proper emblem of the purity and brightness of things above; the other of a saffron colour, expressive of that mixture and variety which is to be found on those lower regions.

Here is what I take to be a possible reference to the white Sirius A and the 'darker' Sirius B. But also, the 'lower regions' are the horizons, where white heavenly bodies at their 'births' and 'deaths' become saffron-coloured.

There is a clearer translation by Babbitt in the precise description of Anubis:

## A FAIRYTALE

### 7.

as 'the combined relation of the things'<sup>31</sup> rather than as 'the common Reason which pervades the light world and the dark world. A circular orbit is just that – a combined relation between the star revolving and the star revolved around. In order to make this more firmly established less as fancy than as fact, I shall cite Plutarch's words from his next paragraph (Babbitt's translation): 'Moreover, they (the Egyptians) record that in the so-called books of Hermes (the Trismegistic literature<sup>32</sup>) it is written in regard to the sacred names

that they call the power which is assigned to direct the revolution of the Sun

## Horus

This is important because we see here that they specifically call the orbit of the sun by a god's name. If they can call the revolution of the sun by a god's name, they can call the revolution of Sirius B (assuming they really knew about it) by a god's name. We are dealing with a precedent. Now we resume this quotation because it is interesting for other reasons. . . . but the Greeks call

it Apollo; and the power assigned to the wind some call Osiris and others Serapis, and Sothis in Egyptian signifies "pregnancy" (cyesis) or "to be pregnant" (cyem); therefore in Greek, with a change of accent, the star is called the Dog-star (Cyon), which they regard as the special star of Isis.

A further piece of information from Plutarch about Anubis is 32. And when the child (Anubis, child of Nephthys by Osiris) had been found, after great toil and trouble, with the help of dogs which led Isis to it, it was brought up and became her guardian and attendant, receiving the name Anubis, and it is said to protect the gods just as dogs protect men.

If Anubis is conceived of as an orbit around Sirius, then he would indeed be attendant upon Isis. He would go round and round her like a guard dog.

Plutarch has an interesting tale. Moreover, Eudoxus says that the Egyptians have a mythical tradition in regard to Zeus that, because his legs were grown together, he was not able to walk. . . .<sup>33</sup> This sounds very like the amphibious Oannes of the Sumerians who had a tail for swimming instead of legs for walking.

Plutarch provides us with an important and crucial clue linking Isis with the Argo and the Argonauts and demonstrating a probable derivation of an idea that has puzzled classicists enormously (and later on we shall see the links between Isis and the Argo considerably elaborated). Like these also are the Egyptian beliefs, for they oftentimes call Isis by the name of Athena, expressive of some such idea as this, "I came of myself," which is indicative of self-impelled motion.<sup>34</sup>

It must be remembered that the Greek goddess Athena, the goddess of the mind and of wisdom, was reputed to have sprung full-fledged from the brow of Zeus. She was not born. She came of herself. However, the quotation must be continued to make the point.

Typhon, as has been said, is named Seth and Bebon and Smu, and these names would indicate some forcible and preventive check or opposition or reversal.

Moreover, they call the lodestone the bone of Horus, and iron the bone

of Typhon, as Manetho records. For, as the iron oftentimes acts as if it were being attracted and drawn toward the stone, and oftentimes is rejected

and repelled in the opposite direction, in the same way the salutary and good and rational movement of the world at one time, by persuasion, attracts and draws towards itself and renders more gentle that harsh and Typhonian movement, and then again it gathers itself together and reverses it and plunges it into difficulties

The identification of Isis with Athena here in connection with lodestones and 'self impelled motion' brings to mind the placing by Athena of a cybernetic\* oak timber from the holy sanctuary of Dodona (supposedly founded by Deukalion, the Greek Noah, after his ark landed) in the keel of the Argo. H. W. Parke in his books *Greek Oracles* and *The Oracles of Zeus* refers to this 'Athena when the Argo was built took a timber from the oak tree of Dodona (the oracular centre of Zeus) and fitted it into the keel. This had the result that the Argo itself could speak and guide or warn the Argonauts at critical moments, as it actually is represented as doing in our extant epics on the subject. The original epic is lost, but there is no reason to doubt that this miraculous feature went back to it, and, if so, was at least as old as the *Odyssey* in which the Argo and its story are mentioned.' Parke then emphasizes most strongly that it is the timber itself that acts as guide. It is self-sufficient and not merely an oracular medium. Thus we see that the Argo had a unique capacity for 'self impelled motion' which was built into it by Athena (whom Plutarch identifies with Isis) 88

Now is a suitable stage to return to the Sumerians, as in their culture we shall find many significant references to fifty heroes 'fifty great gods' etc. But first we shall leave the fifty Argonauts and their magical ship to turn our attention to what appears to be a rather precise Egyptian description of the Sirius system preserved in an unusual source. The source is G. R. S. Mead (who was a friend of the poet Yeats and is mentioned by his nickname 'Old Crore' in Ezra Pound's *Cantos*), whose three volume *Thrice Greatest Hermes* 36 contains a translation of, with extensive prolegomena and notes to, the obscure and generally ignored ancient 'Trismegistic literature' of the Hermetic tradition. These writings are largely scorned by classical scholars who consider them Neoplatonic forgeries. Of course, ever since the wild Neoplatonic boom in the Italian Renaissance period when Marsilio Ficino translated and thereby preserved for posterity (one must grant the Medici the credit for finding and purchasing the manuscripts!) such Neoplatonists as Iamblichus, as well as these Trismegistic writings, the Neoplatonists have been in the doghouse. The Loeb Classical Library still has not published all of Plotinus even now.

But most readers will not be familiar either with the term 'trismegistic' or with the Neoplatonists. So I had better explain. The Neoplatonists are Greek

philosophers who lived long enough after Plato to have lost the name of Platonists as far as modern scholars are concerned (though they were intellectual disciples of Plato and considered themselves Platonists). Modern scholars have added the prefix 'Neo-' to 'Platonist' for their own convenience, in order to

\* Norbert Wiener in *Cybernetics*, the pioneer textbook of computer theory, said: We have decided to call the entire field of control and communication theory, whether in the machine or in the animal by the name *Cybernetics* (from the Greek for) steersman.

## A FAIRYTALE

73

distinguish them from their earlier predecessors, those Platonists who lived within 150 years of Plato himself. The Platonic Academy existed for over nine centuries at Athens. In actuality, scholars talk about 'Middle Platonists', 'Syrian Platonists', 'Christian Platonists', 'Alexandrian Platonists', and so on. I suggest the reader look at my Appendix I, which will tell him a lot about the Neoplatonists and their connection with the Sirius mystery, and which deals primarily with Proclus.

G. R. S. Mead, at the beginning of his work *Thrice Greatest Hermes*, explains fully what 'the Trismegistic Literature' is. He calls it 'Trismegistic' instead of by its earlier designation 'Hermetic' (from the name of the Greek god Hermes), in order to distinguish it from other less interesting writings such as the Egyptian Hermes prayers and also the Hermetic Alchemical Literature. The Trismegistic writings are now fragmentary and consist of a large amount of exceedingly strange sermons, dialogues, excerpts by Stobaeus and the Fathers of the Church from lost writings, etc. I hesitate to give a brief summary of them and suggest that the interested reader actually look into this subject himself. There are some matters which defy summary, and I consider this to be one of them. The writings contain some 'mystical' elements and certainly some sublime elements. old Cosimo de Medici was told by Ficino that he could translate for him either the Hermetic Literature or the dialogues of Plato, but not both at once. Cosimo knew he was dying. He said something like: 'If only I could read the Books of Hermes, I would die happy. Plato would be nice but not as important. Do the Hermes, Ficino. And Ficino did.

As I explain fully in Appendix I, the Neoplatonists are so thoroughly despised through the bias of the moment, however one cares to define that bias, that the Trismegistic literature suffers with Neoplatonism under the onus

of being considered too far removed from reality and logic and being inclined inwards the mystical. This does not fit well with the hard rationalism of an age still bound by the (albeit decaying) fetters of nineteenth-century scientific deterministic prejudice. The sublime irony is, of course, that proven and authentic Egyptian texts are obviously mystical, but that is considered all right. However, as long as there is a belief that the Trismegistic literature is

Neoplatonic it will be despised because it is mystical

The Trismegistic literature may be Neoplatonic. But that does not make what it has to say about Egyptian religion any less valid per se than the 'Isis and Osiris' by the Greek Plutarch, who was only slightly earlier in time than the Neoplatonist Greeks. It is time for scholars to pay some attention to this sadly neglected material. Much of the Trismegistic literature probably goes back to genuine sources or compilations such as Manetho's *Ast Sothis*. Or the literature may be quite ancient, in which case some of it cannot, in its present form, be earlier than the Ptolemaic period when the Zodiac as we know it was introduced into Egypt by the Greeks who in turn had it from Babylon. (I

cannot here discuss the matter of earlier forms of zodiac, such as at Denderah.)

Mead quotes an Egyptian magic papyrus, this being an uncontested Egyptian document which he compares to a passage in the Trismegistic

literature: 'I invoke thee, Lady Isis, with whom the Good Daimon doth unite,

He who is Lord in the perfect black' "

We know that Isis is identified with Sirius A, and here we may have a

74

## THE SIRIUS MYSTERY

description of her star-companion 'who is Lord in the perfect black', namely the invisible companion with whom she is united, Sirius B.

Mead, of course, had no inkling of the Sirius question. But he cited this magic papyrus in order to shed comparative light on some extraordinary passages in a Trismegistic treatise he translated which has the title 'The Virgin of the World'. In his comments on the magic papyrus Mead says: 'It is natural to make the Agathodaimon ("the Good Daimon") of the Papyrus refer to Osiris, for indeed it is one of his most frequent designations. Moreover it is precisely Osiris who is pre-eminently connected with the so-called "under-world", the unseen world, the "mysterious dark". He is lord there and indeed one of the ancient mystery sayings was precisely, "Osiris is a dark God".'

'The Virgin of the World' is an extraordinary Trismegistic treatise in the form of a dialogue between the hierophant (high priest) as spokesman for Isis and the neophyte who represents Horus. Thus the priest instructing the initiate is portrayed as Isis instructing her son Horus.

The treatise begins by claiming it is 'her holiest discourse' which 'so speaking

Isis doth pour forth' There is, throughout, a strong emphasis on the hierarchical principle of lower and higher beings in the universe that earthly mortals are presided over at intervals by other, higher, beings who interfere in Earth's affairs when things here become hopeless, etc. Isis says in the treatise: 'It needs must, therefore, be the less should give place to the greater mysteries.' What she is to disclose to Horus is a great mystery. Mead describes it as the mystery practised by the arch-hierophant. It was the degree (here degree is in the sense of 'degree' in the Masonic 'mysteries', which are hopelessly garbled and watered-down versions of genuine mysteries of earlier times) 'called the "Dark Mystery" or "Black Rite"'. It was a rite performed only for those who were judged worthy of it after long probation in lower degrees, something of a far more sacred character, apparently, than the instruction in the mysteries enacted in the light.'

Mead adds: 'I would suggest, therefore, that we have here a reference to the most esoteric institution of the Isiac tradition', Isiac meaning of course 'Isis-tradition', and not to be confused with the Book of Isaiah in the Bible (so that perhaps it is best for us not to use the word-form 'Isiac').

It is in attempting to explain the mysterious 'Black Rite' of Isis at the highest degree of the Egyptian mysteries that Mead cited the magic papyrus which I have already quoted. He explains the 'Black Rite' as being connected with Osiris being a 'dark god' who is 'Lord of the perfect black' which is 'the unseen world, the mysterious black'.

This treatise 'The Virgin of the World' describes a personage called Hermes who seems to represent a race of beings who taught earthly mankind the arts of civilization after which: 'And thus, with charge unto his kinsmen of the Gods to keep sure watch, he mounted to the Stars.

According to this treatise mankind have been a troublesome lot requiring scrutiny and, at rare intervals of crisis, intervention.

After Hermes left Earth to return to the stars there was or were in Egypt someone or some people designated as 'Tat' (Thoth) who were initiates into the celestial mysteries. I take this to refer to the Egyptian priests. However, one of the most significant passages in the treatise follows immediately upon this:

## A FAIRYTALE

75

statement, and indicates to me that this treatise must have some genuine Egyptian source, for no late Greek should have been capable of incorporating (his). But in order to recognize this one must know about the extraordinary Imhotep, a brilliant genius, philosopher, doctor and Prime Minister (to use our terms) during the Third Dynasty in Egypt circa 2600 B.C. under King Zoser, whose tomb and temple he constructed and designed himself. (This is the famous step-pyramid at Sakkara, the first pyramid ever built and the world's earliest stone building according to some.) Imhotep was over the centuries

gradually transformed into a god and a son of Ptah' One reason why the process of his deification may have been retarded for some thousands of years is that writings by him survived, rather like the survival of the Gathas by Zarathustra (Zoroaster), making it impossible to claim that a man who left writings could in fact have been a god Just like Mohammed and Zoroaster Imhotep remained a sort of 'prophet' through his surviving writings

For the significant passage, now, here is the entire paragraph 'To him (Hermes) succeeded Tat, who was at once his son and heir unto these knowledges [this almost certainly implies a priesthood] and not long afterwards Asclepius Imuth, according to the will of Ptah who is Hephaestus, and all the rest who were to make enquiry of the faithful certitude of heavenly contemplation, as Foreknowledge (or Providence) willed, Foreknowledge queen of all '

Now this is a really striking passage We have the mysterious 'Hermes' succeeded by an Egyptian priesthood of Thoth Then 'not long afterwards' we have someone called Asclepius Imuth 'according to the will of Ptah' This is Imhotep' Ptah, known to the Greeks as Hephaestus, was considered the father of Imhotep in late Egyptian times In fact, it is interesting that this text avoids the late form son of Ptah to describe Imhotep Imhotep was known to the Greeks and provided the basis for their god Asclepius (the Greek god of medicine, corresponding to Imhotep's late form as Egyptian god of medicine) Imhotep is also spelled Imouthes, Imothes, Imutep, etc Hence the form in this treatise 'Asclepius Imuth

There is absolutely no question that Imhotep is being referred to here And in the light of that, certain other statements in this passage become quite interesting

It has already been mentioned that in a treatise like 'The Virgin of the World', where gods' names are thrown round like birdseed, the authors were exceedingly restrained to have avoided labelling Asclepius Imhotep as 'a son Of Ptah Hephaestus' This may, indeed, point to a genuine early source from the time before that when the Egyptians ceased to regard Imhotep as a mortal

Hurry says 38

For many years Egyptologists have been puzzled to explain why Imhotep, who lived in the days of King Zoser, ca. 2900 B.C. was not ranked among the full gods of Egypt until the Persian period, dating from 525 b.c. The apotheosis of a man, however distinguished, so many centuries after his life on earth seems mysterious The explanation appears to be that first suggested by Erman, viz. that Imhotep, at any rate during a large part of the interval was regarded as a sort of hero or demigod and received semi-divine worship Erman suggested that this rank of demigod was bestowed

on him at the time of the New Kingdom, i.e. about 1580 B.C. but more recent evidence seems to indicate that this demigod stage was reached at a much earlier period.

Here a bit of chronology helps. 'The Virgin of the World' correctly described Imhotep as 'not long afterwards' following upon the creation of the Egyptian priesthood, presumably in the First Dynasty after Menes, in the form in which it would be known after the unification of Egypt. Imhotep lived in the Third Dynasty at the beginning of the Old Kingdom. I.E.S. Edwards<sup>39</sup> estimates this as commencing about 2686 B.C. He puts the start of the First Dynasty about 3100 B.C. Imhotep is thus literally 'not long afterwards'. Whoever wrote 'The Virgin of the World' knew his Egyptian chronology and also did not call Imhotep 'son of Ptah'.

There is another point. Looking at this statement from 'The Virgin of the World' '... and all the rest (i.e. after Imhotep) who were to make enquiry of the faithful certitude of heavenly contemplation...', we find that we have a reference to successors of Imhotep who 'enquired' into the riddles of the universe and also a description of Imhotep's own activities as an 'enquirer'. This also is accurate and reflects considerable knowledge of the subject. For Imhotep is often described as the first genuine philosopher known by name. And on p. 30 of his book, Hurry refers to apparent successors mentioned in an Oxyrhynchus papyrus (in Greek, edited by Grenfell and Hunt) which relates that 'Imhotep was worshipped as early as the IVth Dynasty, and his temple was resorted to by sick and afflicted persons'. Hurry further says 'The other persons are Horus son of Hermes, and Kaleoibis son of Apollo (Imhotep being a son of Ptah), it is not known who these were'. Could they have been successors of Imhotep at 'enquiring'? It seems likely that we shall be learning more of these people as excavations in Egypt proceed. In 1971-2 there came to light at Sakkara a remarkable group of texts written by a man named Hor (from Horus), describing his life at an Egyptian temple in the Ptolemaic period, recounting his dreams and his political encounters. These texts should have been published by 1976 by the Egypt Exploration Society.

Hurry refers to the Trismegistic (Hermetic) literature as follows: 'If the references to Imhotep in Hermetic literature can be trusted, he was also interested in astronomy and astrology, although no special observations are associated with his name. Sethe gives various references to that literature, showing that Imhotep was reputed to have been associated with the god Thoth (Hermes) in astronomical observations'.<sup>40</sup> Obviously Imhotep, as chief priest under King Zoser (for he held that office as well), was associated with Thoth (Tat) in the form of the priesthood previously mentioned who had the 'Dark Rite' as their highest mystery. Here is actual confirmation, then, that it was astronomical matters with which they dealt. In other words, my astronomical interpretation receives some confirmation from this source as well. It is nice when loose ends tie up.



Inscriptions in a temple at Edfu built by Ptolemy III Euergetes I (237 B.C.) describe Imhotep as 'the great priest Imhotep the son of Ptah, who speaks or lectures' Hurry says Imhotep enjoyed the reputation of being "one of the greatest of Egyptian sages",<sup>41</sup> his fame for wisdom made so deep an impression

## A FAIRYTALE

77

on his countrymen that it endured as a national tradition for many centuries.

'As regards his literary activities, he is said to have produced works on medicine and architecture, as well as on more general subjects, and some of his works were extant at the dawn of the Christian era. his eminence as a man of letters led him to be recognized as the "patron of scribes"

In other words, he was the first great philosopher And he obviously spoke and lectured' in his lifetime Perhaps he was the first classical Greek in prototype We also have something to look forward to his tomb has yet to be discovered It is thought to be at Sakkara, and the late Professor Emery more than once thought he had come close to discovering it in his excavations there which are now being carried on by Professor Smith, who is a man with a strange enough aura about him to convince anyone that he is capable of making a discovery which would be the most important in archaeological history and beside which the minor and later tomb of a boy Pharaoh named Tutankhamen would entirely pale by comparison But perhaps the most interesting thing about the possible forthcoming discovery of Imhotep's tomb is that it will almost certainly be full of books. Would a man like Imhotep be buried without them?

Bearing these books in mind (and I am sure they are there waiting underground like a time bomb for us), it is interesting to read this passage in 'The Virgin of the World' following shortly upon that previously quoted

The sacred symbols of the cosmic elements were hid away hard by the secrets of Osiris Hermes, ere he returned to Heaven, invoked a spell on them, and spake these words O holy books, who have been made by my immortal hands, by incorruption's magic spells (at this point there is a lacuna as the text is hopeless) free from decay throughout eternity remain and incorrupt from time' Become unseeable, unfindable, for every one whose foot shall tread the plains of this land, until old Heaven doth bring forth meet instruments for you, whom the Creator shall call souls'

Thus spake he; and, laying spells on them by means of his own works, he shut them safe away in their own zones And long enough the time has been since they were hid away

In the treatise the highest objective of ignorant men searching for the truth is described as: '(Men) will seek out the inner nature of the holy spaces which no foot may tread, and will chase after them into the height, desiring to

observe the nature of the motion of the Heaven

'These are as yet moderate things For nothing more remains than Earth's remotest realms, nay in their daring they will track out Night, the farthest Night of all '

We will chase out into the height' of space to 'observe the nature of the motions of the Heavens', says this old (indeterminately old) treatise How correct it was. We have now landed on the moon, which is chasing out into the height' with a vengeance And we are indeed 'observing the nature of the notion of the Heavens And the treatise is also right in saying that these are yet moderate things For as everyone knows, the people in the space programme feel as if they have only just begun Man will only pause properly again when he has made the entire solar system his familiar and his own. Then we shall

be faced with the limitations of our solar system and the barrier that separates it from the stars What then ? Yes, what we have done to date certainly deserves the description of 'yet moderate things' Vasco da Gama may have congratulated himself on his brilliant navigational accomplishments, but as we can clearly see in his case, a beginning is only a beginning. It is 'yet moderate things'

According to the treatise, after these moderate things we shall 'in our daring' even learn the greatest secret we shall discover 'Night' And the meaning of the 'Dark Rite' will become clear And as this rite and this mystery concern Isis and the star Sirius and by the context of this prophecy clearly concerns the heavens, can we be accused of sensationalism in making the suggestion that nothing would shake up the human race more than having the discovery of intelligent life elsewhere in the universe proven for the first time ? And what if the dark companion of Sirius really does hold the answer to this mystery? What if the nearest centre of civilization really is based at the Sirius system and keeps a watchful eye on us from time to time ? What if this is proven by our detecting on our radio telescopes actual traces of local radio communications echoing down those nine light years of space in the vast spreading ripple of disintegrating signals that any culture remotely near to us in development would be bound to dribble forth into the surrounding universe ? What if this happens? It will be like the sky falling in, won't it?

#### Notes

1. Le Renard Pale, p. 325 Figure 109 in that book shows it, drawn as 'the meeting of Sirius with the Sun'
2. Mariette, Denderah, Vol I, p. 206

3 Aratus, *Phaenomena* 331-6 English translation in Loeb Library series, in volume with Callimachus and Lycophron See bibliography

4 Vol I, p 1, of Egyptian Astronomical Texts, Otto Neugebauer and Richard Parker Brown University Press, 1960-7

5 Ibid , Vol I, p 25

6 The Gods of the Egyptians. London, 1904, Vol II, p. 114

7 Ibid , Vol II, p. 113

8 Ibid , Vol II, p. 117

9 Ibid , Vol II, p. 215

10 Ibid , Vol II pp. 202-3

11 Ibid , Vol II p 264

12 Ibid , Vol II p 265

13 Ibid , Vol II p 139

14 Neugebauer and Parker, op cit

15 Star Names, Their Lore and Meaning, R. H. Allen, Dover Publications, New York, 1963 p. 130

16 Neugebauer and Parker, op cit

17 Star Names, Their Lore and Meaning, p. 68

18 Ibid p 65

19 Ancient Near Eastern Texts relating to the Old Testament, ed. by James B Pritchard, Princeton University Press, 1955 p. 33

20 Ibid , p. 41

21 Alexander Heidel, The Babylonian Genesis, University of Chicago Press, 1965, p. 86

22 Wallis Budge, op cit , Vol I, p. 284

23 Ibid , Vol I, p. 290

24 Ibid , Vol II p 154, and Vol I, p. 446

25 Ibid , Vol I, p. 154

## A FAIRYTALE

79

26 Ibid Vol II, p 261

27 Ibid., Vo. II pp. 264-5

28 Ibid Vol II, pp. 195-200

29 Ibid Vol II, pp. 264-5

30 'Isis and Osiris' Loeb edition, p 107

31 Ibid., p. 145

32 Ibid., p. 39

Ibid , p. 149

34 Ibid , p. 147

35 The Oracles of Zeus, H. W. Parke, p 13

36 Thrice Greatest Hermes, G. R. S. Mead. John Watkins, London, 1964

37 Ibid, Vol III, p 95 He quotes from Wessley, Denkschr d k Akad (1893), P 37, 1-500

38 See Imhotep, the Vizier and Physician of King Zoser and afterwards the Egyptian God of Medicine, by Jamieson B. Hurry, Oxford University Press, 1926

39 I. E. S. Edwards, The Pyramids of Egypt. Penguin, 1970

40 Hurry op. cit p 20

41 Ibid p 40

## SUMMARY

Sirius was the most important star in the sky to the ancient Egyptians. The ancient Egyptian calendar was based on the rising of Sirius. It is established for certain that Sirius was sometimes identified by the ancient Egyptians with their chief goddess Isis

The companion of Isis was Osiris, the chief Egyptian god. The 'companion' of the constellation of the Great Dog (which includes Sirius) was the constellation of Orion. Since Isis is equated with Sirius, the companion of Isis must be equated, equally, with the

companion of Sirius. Osiris is thus equated on occasion with the constellation Orion.

We know that the 'companion of Sirius' is in reality Sirius B. It is conceivable that Osiris-as-Orion, the companion of Sirius, is a stand-in for the invisible true companion Sirius B.

'The oldest and simplest form of the name of Osiris, we are told, is a hieroglyph of a throne and an eye. The 'eye' aspect of Osiris is thus fundamental. The Bozo tribe of Mali, related to the Dogon, call Sirius B 'the eye star'. Since Osiris is represented by an eye and is sometimes considered the companion of Sirius, this is equivalent to saying that Osiris is 'the eye star' provided only that one grants the premises that the existence of Sirius B really was known to the ancient Egyptians and that 'the companion of Sirius' therefore could ultimately refer to it.

The meanings of the Egyptian hieroglyphs and names for Isis and Osiris were unknown to the earliest dynastic Egyptians themselves, and the names and signs appear to have a pre-dynastic origin which means around or before 3200 B.C., in other words 5,000 years ago at least. There has been no living traditional explanation for the meanings of the names and signs for Isis and Osiris since at least 2800 B.C. at the very latest.

'The Dog Star' is a common designation of Sirius throughout known history. The ancient god Anubis was a 'dog god', that is, he had a man's body and a dog's head.

In discussing Egyptian beliefs, Plutarch says that Anubis was really the son of Nephthys, sister to Isis, although he was said to be the son of Isis. Nephthys was 'invisible' - his was 'visible'. (In other words, the visible mother was the stand-in for the invisible mother, who was the true mother for the simple reason that the invisible mother could not be perceived.)

Plutarch said that Anubis was a horizontal circle, which divides the invisible part which they call Nephthys, from the visible, to which they give the name Isis, and as this circle equally touches upon the confines of both light and darkness, it may be looked upon as common to them both.

80

## TIE SIRIUS MYSTERY

This is as clear an ancient description as one could expect of a circular orbit (called 'Anubis') of a dark and invisible star (called Nephthys) around its 'sister', a light and visible star (called 'Isis') - and we know Isis to have been equated with Sirius. What is missing here are the following specific points which must be at this stage still our assumptions: (a) The circle is actually an orbit, (b) The divine characters are actually stars, specifically in this context.

Actually, Anubis and Osiris were sometimes identified with one another. Osiris, the

companion of Isis who is sometimes the companion of Sirius is also sometimes identified with the orbit of the companion of Sirius, and this is reasonable and to be expected

Isis-as-Sirius was customarily portrayed by the ancient Egyptians in their paintings as traveling with two companions in the same celestial boat. And as we know, Sirius does, according to some astronomers, have two companions, Sirius B and Sirius C.

To the Arabs, a companion star to Sirius (in the same constellation of the Great Dog) was named 'Weight' and was supposed to be extremely heavy - almost too heavy to rise over the horizon. Ideer calls this an astonishing star-name/ we are told, not surprisingly

The true companion star of Sirius, Sirius B, is made of super-dense matter which is heavier than any normal matter in the universe and the weight of this tiny star is the same as that of a gigantic normal star.

The Dogon also, as we know, say that Sirius B is 'heavy' and they speak of its 'weight'

The Arabs also applied the name 'Weight' to the star Canopus in the constellation Argo. The Argo was a ship in mythology which carried Danaos and his fifty daughters to Rhodes. The Argo had fifty oarsmen under Jason, called Argonauts. There were fifty oars to the Argo, each with its oarsman-Argonaut. The divine oarsman was an ancient Mediterranean motif with sacred meanings.

The orbit of Sirius B around Sirius A takes fifty years, which may be related to the use of the number fifty to describe aspects of the Argo.

There are many divine names and other points in common between ancient Egypt and ancient Sumer (Babylonia). The Sumerians seem to have called Egypt by the name of 'Magan' and to have been in contact with it.

The chief god of Sumer, named Anu, was pictured as a jackal, which is a variation of the dog motif and was used also in Egypt for Anubis, the dog and the jackal apparently being interchangeable as symbols. The Egyptian form of the name Anubis is 'Anpu' and is similar to the Sumerian 'Anu' and both are jackal gods.

The famous Egyptologist Walter Budge was convinced that Sumer and Egypt both derived their own cultures from a common source which was exceedingly ancient.

Anu is also called An (a variation) by the Sumerians. In Egypt Osiris is called An also.

Remembering that Plutarch said that Anubis (Anpu in Egyptian) was a circle, it is interesting to note that in Sanskrit the word Anda means 'eclipse'. This may be a coincidence.

Walter Budge says that Anubis represents time. The combined meanings of 'time' and 'circle' for Anubis hint strongly at 'circular motion'.

The worship of Anubis was a secret mystery religion restricted to initiates (and we thus do not know its content) Plutarch, who writes of Anubis, was an initiate of several mystery religions, and there is reason to believe his information was from well informed sources (Plutarch himself was a Greek living under the Roman Empire ) A variant translation of Plutarch's description of Anubis is that Anubis was 'a combined relation between Isis and Nephthys. This has overtones which help in thinking of 'the circle' as an orbit - a combined relation' between the star orbiting and the star orbited

The Egyptians used the name Horus to describe 'the power which is assigned to direct the revolution of the sun' according to Plutarch. Thus the Egyptians conceived of and named such specific dynamics - an essential point

## A FAIRYTALE

81

Plutarch says Anubis guarded like a dog and attended on Isis. This fact, plus Anubis being time - and a circle - suggests even more an orbital concept - the ideal form of attendance of the prowling guard dog

Aristotle's friend Eudoxus (who visited Egypt) said that the Egyptians had a tradition that Zeus (chief god of the Greeks whose name is used by Eudoxus to refer to his Egyptian equivalent, which leaves us wondering which Egyptian god is meant - presumably Osiris) could not walk because 'his legs were grown together'. This sounds like an amphibious creature with a tail for swimming instead of legs for walking. It is like the semi-divine creature Oannes, reputed to have brought civilization to the Sumerians, who was amphibious, had a tail instead of legs, and retired to the sea at night.

Plutarch relates Isis to the Greek goddess Athena (daughter of Zeus) and says of them they were both described as 'coming from themselves' and as 'self-impelled motion'. Athena supervised the Argo and placed in its prow the gliding oak timber from Dodona (which is where the Greek ark landed, with the Greek version of the Biblical Noah, Deukalion, and his wife Pyrrha). The Argo thus obtained a distinctive 'self-impelled motion' from Athena, whom Plutarch specifically relates to Isis in this capacity.

The earliest versions of the Argo epic which were written before the time of Homer are unfortunately lost. The surviving version of the epic is good reading but relatively recent (third century B.C.).

The Sumerians had 'fifty heroes, fifty great gods', etc., just as the later Greeks with their Argo had 'fifty heroes' and the Argo carried 'fifty daughters of Danaos'.

An Egyptian papyrus says the companion of Isis is 'Lord in the perfect black'. This sounds like the invisible Sirius B. Isis's companion Osiris 'is a dark god'.

The Trismegistic treatise 'The Virgin of the World' from Egypt refers to 'the Black Rite', connected with the 'black' Osiris, as the highest degree of secret initiation possible in the ancient Egyptian religion - it is the ultimate secret of the mysteries of Isis.

This treatise says Hermes came to earth to teach men civilization and then again 'mounted to the stars', going back to his home and leaving behind the mystery religion of Egypt with its celestial secrets which were some day to be decoded.

There is evidence that 'the Black Rite' did deal with astronomical matters. Hence the Black Rite concerned astronomical matters, the black Osiris, and Isis. The evidence mounts that it may thus have concerned the existence of Sirius B.

A prophecy in the treatise 'The Virgin of the World' maintains that only when men concern themselves with the heavenly bodies and 'chase after them into the height' can men hope to understand the subject matter of the Black Rite. The understanding of astronomy of today's space age now qualifies us to comprehend the true subject of the Black Rite, if that subject is what we suspect it may be. This was impossible earlier in the history of our planet. It must be remembered that without our present knowledge of white dwarf stars which are invisible except with modern telescopes, our knowledge of super-dense matter from atomic physics with all its complicated technology, etc., none of our discussion of the Sirius system would be possible. It would not be possible to propose such an explanation of the Black Rite at all. We could not propound the Sirius question. Much material about the Sumerians and Babylonians has only been circulated since the late 1950s and during the 1960s, and our knowledge of pulsars is even more recent than that. It is doubtful that this book could have been written much earlier than the present. The author began work in earnest in 1967 and finished the book in 1974. Even so, he feels the lack of much needed information: sites remain unexcavated, texts untranslated from various ancient languages, astronomical investigations are perpetually incomplete. The author has also found it difficult to master material from so many different fields and wishes he were much better qualified. The Sirius question could not realistically have been posed much earlier and future discoveries in many fields will be essential to its full consideration.

## The Sacred Fifty

We must return to the treatise 'The Virgin of the World'. This treatise is quite explicit in saying that Isis and Osiris were sent to help the Earth by giving primitive mankind the arts of civilization.

And Horus thereon said:

'How was it, mother, then, that Earth received God's Efflux?'

And Isis said:

'I may not tell the story of (this) birth, for it is not permitted to describe the origin of thy descent, O Horus (son) of mighty power, lest afterwards the way of birth of the immortal gods should be known unto men - except so far that God the Monarch, the Universal Orderer and Architect, sent for



a little while thy mighty sire Osiris, and the mightiest goddess Isis, that they might help the world, for all things needed them

'Tis they who filled life full of life 'Tis they who caused the savagery of mutual slaughtering of men to cease 'Tis they who hallowed precincts to the Gods their ancestors and spots for holy rites. 'Tis they who gave to men laws, food and shelter Etc

They are also described as teaching men how to care for the dead in a specifically Egyptian way, which inclines one to wonder how a Greek could conceivably have written this unless during the Ptolemaic period 'Tis they who taught men how to wrap up those who ceased to live, as they should be

Now anyone knows this is Egyptian and not Greek practice What Neoplatonist would include such a statement unless it were actually taken from an early source which he used, and which had been written by someone actually living in Egypt?

The treatise ends this long section with

'Tis they alone who, taught by Hermes in God's hidden codes, became the authors of the arts, and sciences, and all pursuits which men do practise, and givers of their laws.

'Tis they who, taught by Hermes that the things below have been disposed by God to be in sympathy with things above, established on the earth the sacred rites over which the mysteries in Heaven preside [The absence here of a blatant propaganda for astrology argues a pre-Ptolemaic date for this treatise after the Greek and Babylonian influx a mild statement like this would have been almost impossible to make without the author dragging in all the paraphernalia of the astrology craze of late Egypt]

## THE SACRED FIFTY

83

'Tis they who, knowing the destructibility of (mortal) frames, devised the grade of prophets, in all things perfected, in order that no prophet who stretched forth his hands unto the Gods, should be in ignorance of anything, that magic and philosophy should feed the soul, and medicine preserve the body when it suffered pain

'And having done all this, my son, Osiris and myself perceiving that the world was (now) quite full, were thereupon demanded back by those who dwell in Heaven'

And in the treatise Isis claims that the 'Black Rite' honours her and 'gives perfection' It is also concerned with the mysterious thing called 'Night' 'Who weaves her web with rapid light though it be less than Sun's' It is made plain that 'Night' is not the night sky because it moves in the Heaven along

with 'the other mysteries in turn that move in Heaven, with ordered motions and with periods of times, with certain hidden influences bestowing order on the things below and co-increasing them

We must scrutinize the description of what is labelled Night in this treatise. This description makes it perfectly clear that Night is not 'night', but a code word. For it is said to have 'light though it be less than Sun's'. The dark companion of Sirius is a star and has light, though less than the sun. Also Night' said to weave her web with rapid light' which specifically describes the object as being in motion. Since Sirius B orbits Sirius A in fifty years, it moves more rapidly even than three of our sun's planets in our own solar system. Pluto, Neptune and Uranus. Of these three, Uranus is the most rapid, and its orbit about the sun takes eighty-four years. So here is a star orbiting more rapidly than a planet! That may indeed be said to constitute 'weaving a web with rapid light'.

Now to turn to the Sumerian culture, or, more properly, the Sumero-Ukadian culture. It was roughly contemporaneous with ancient Egypt and I had already suspected its basic religious concepts to be so similar to those of Egypt that I imagined them to have a common origin. Then I discovered that Walis Budge thought the same thing from his point of view as a distinguished Egyptologist. I am not aware of any Sumero-ologists having dealt with this particular problem. Far more attention has been given to the known trading links which existed between Sumer and the Indus valley civilization, and also to the problem of deciding where Dilmun was located. Kramer thinks Dilmun was the Indus valley. Bibby follows Peter B. Cornwall and thinks it was the island of Bahrain in the Persian Gulf. But to the Sumerians this land, which lay in a direction seemingly other than that of Egypt, had immense importance consequently, it has tended to monopolize the attention of modern scholars investigating Sumerian geographical references. Kramer thinks that the land Magan' was probably Egypt and that Sargon even sent his armies there.

The basic Egyptian astronomy and the basic Sumero-Akkadian astronomy (this assumes a continuity of some sort, as there is no overtly astronomical treatise from the early period of Sumer) are identical. For the multitude of variations at a less basic level, one may consult Professor Otto Neugebauer's *The Exact Sciences in Antiquity*. But Neugebauer's interests lie with late material, as he admits, and he does less than justice to the earlier material, skimming

## THE SIRIUS MYSTERY

84

over it quickly and making little of some things which are important. Here is an example of his attitude expressed in his own words near the beginning of Chapter V: 'Our description of Babylonian astronomy will be rather in

complete. The historical development will be given in bare outline. As in the case of Egypt, a detailed discussion of the few preserved early texts would require not only too much room but would also unduly exaggerate their historical importance. For the late period, however, the opposite situation prevails. 'Well, at least Professor Neugebauer is honest about his preferences.

Having nodded in the direction of an authority who has voluntarily abdicated, we proceed. For our evidence we turn to E. A. Speiser's translation of the Akkadian creation epic known as the *Enuma elish* from the first two words of the text which mean 'When on high'. At the very beginning of this text we read

He constructed stations for the great gods,

Fixing their astral likenesses as constellations.

He determined the year by designating the zones.

He set up three constellations for each of the twelve months.

After defining the days of the year [by means] of (heavenly) figures,

He founded ..., etc

In other words, the text gives a system identical with that recorded in the Egyptian star clocks. Twelve months composed of three ten-day weeks each, resulting in thirty-six constellations or 'decans' designating astral likenesses of gods. The text specifically states that there are twelve months consisting of three periods each (unless one strains the point enormously and maintains on no grounds whatsoever that these three periods are unequal, they must be of ten days each—hence 'ten-day weeks' as in Egypt), and that a constellation or 'zone' of the sky applies to each of these 'weeks'. Since three times twelve equals thirty-six, we have thirty-six decans, each of which is 'designated' by a constellation. And also as in Egypt, each decan is an 'astral likeness' of a great god. It is surprising that no scholar has seen that this passage in the *Enuma elish* describes the Egyptian star-clock system down to the last detail.

No doubt also the five 'epagomenal' days left over in order to fill out this resulting 360-day year to a 365-day year are referred to in the line 'After defining the days of the year of (heavenly) figures,' which is again identical with the Egyptian tradition where the five left-over days are each assigned to five different gods or heavenly figures and thus defined. In Egypt these five left-over days are called 'the days upon the year'. These five days are also extremely important in Maya astronomy. But if we get into a discussion of Maya astronomy, we shall be stirring up a hornet's nest. It is not relevant to the purposes of this book.

We can see that the astronomical systems in Egypt and Sumer were also

lately identical in their fundamentals. Now these similarities between Egypt and Sumer are a far different matter from similarities of names of gods and religious concepts. One can always maintain that people in different parts of the globe spontaneously produce identical sounds when awe-struck by divine concepts. Everybody around the world says "Ma!" to Mother, as we have all heard many times. But an astronomical system of this kind is a complex set of

## THE SACRED FIFTY

85

specific data. The fact that this Akkadian text tentatively dated by Speiser at the Old Babylonian period (i.e. the early part of the second millennium B.C.) records an astronomical system of this complexity which is identical with that of the Egyptian star clocks can be said to prove either contact between these two civilizations or a common derivation for the system. And it suggests a date which could serve as an upper limit. Culture contact during which this information was shared could not have been any later. Let any latest date accepted for the writing of the Enuma elish serve as an upper limit. If this be done, we find the first millennium B.C. as the upper limit, even for those who require incontrovertible physical proof. The contact between Egypt and Sumer must have been considerably earlier if direct, or it may not have been a contact, but rather a common derivation (which was Wallis Budge's favoured idea).

The Egyptian star clocks date from at least the reigns of Seti I (1303 - 1290 B.C.) and Ramses IV (1158 - 1152 B.C.) of the XIXth and XXth Dynasties respectively, on the walls of whose tombs they are found. Therefore these star clocks are at least as old as 1300 B.C. and seem to go back to the very origins of Egyptian culture. By the first millennium B.C. they had been changed and a fifteen-day week substituted for the ten-day week. Other innovations took place as well at later dates, and the system fell into a considerable decay and became, it seems, a relic. I should imagine that a rise in the popularity of the sun god Ra made stars and especially Sirius seem less important. In any case, the innate integrity of the Sirius system in Egypt began to rot away and be ignored by the first millennium B.C., as it was superseded by ideas more obvious and less esoteric to impatient priests. Perhaps when this began to happen some purists may have gone off to other places where they hoped to retain the traditions without interference from decadent Pharaohs. We shall return much later to this idea, with some surprising information.

But let us return to Sumer and continue in hot pursuit. In Tablet VI of the Enuma elish we find an interesting passage. In it are mentioned the Anunnaki who were the sons of An (An means 'heaven') also known as Anu the great god. These Anunnaki were fifty in number and were called 'the fifty great gods'. Nearly always these Anunnaki were anonymous, the emphasis being on their number and their greatness and their control over fate. No certain identification of any important Sumerian god with any one of the Anunnaki exists except peripherally (as I shall describe later). In fact, all Sumerologists have been puzzled by the Anunnaki. They have not been identified and no one knows exactly what is meant by them. They recur often throughout the texts, which makes it all the more annoying that nowhere are they explicitly explained.

But their apparent importance to the Sumerians cannot be questioned

In an early Sumerian fragment (from a time long before the civilization of the Babylonians) of the material concerning the epic hero Gilgamesh, entitled 'Gilgamesh and the Land of the Living' we find an antecedent to the tradition of the Argonauts of the Greeks. This fragment appears in a translation by Kramer. In fact, I feel it is safe to say that this Sumerian fragment is the earliest known form of the story of that hero who was later to be named Jason. In the story from this fragment, the hero, Gilgamesh, wishes to go to the 'Land of the Living', which is described as being in the charge of the sun god Utu. In the story of Jason and the Argonauts, the hero, Jason, wishes to search for the

golden fleece, which is known to be a solar symbol. In the Sumerian fragment we also find the surprising line 'The hero, his teeth are the teeth of a dragon. In the Jason story, the hero, Jason, sows the dragon's teeth' (So does Cadmus in another Greek tale which we shall examine later.)

In the Jason story, Jason is accompanied on his quest by the fifty Argonauts. In the Sumerian fragment, Gilgamesh is accompanied by fifty companions also. Here is the relevant passage (in which Gilgamesh is speaking):

'Who has a house, to his house' 'Who has a mother, to his mother'

'Let single males who would do as I (do), fifty, stand by my side'

Who had a house, to his house, who had a mother to his mother,

Single males who would do as he (did) fifty, stood at his side

To the house of the smiths he directed his step.

The [axe], the [axe], his 'Might of Heroism' he caused to be cast there

To the [garden of the palm] he [directed] his step,

The [tree], the willow, the apple tree, the box tree the [tree] he

[felled] there

The 'sons' of his city who accompanied him [placed them] in their hands

The fifty companions are mentioned several times. The fragmentary text is extremely broken and confused. Further light on the motif of sowing the dragon's teeth seems to come from a passage where Gilgamesh, who has for some un-

known reason been asleep, was awakened, girded himself, stood like a bull on the 'great earth' and 'He put (his) mouth to the ground, (his) teeth shook'. Note that it is at least open to question that the mouth and the teeth are actually his, and the word 'his' is both times in parentheses, put thus by the translator. But here is the entire passage:

He put (his) mouth to the ground, (his) teeth shook

'By the life of Ninsun, my mother who gave birth to me, of pure Lugulbanda,

my father,

'May I become as one who sits to be wondered at on the knee of Ninsun.

my mother who gave birth to me

Apart from the fact that Gilgamesh's desire to sit on the knee of his mother, the goddess Ninsun, is similar to Horus sitting on the knee of his mother, the goddess Isis as a constant motif in Egyptian art, there seems to be here an obscure but significant reference to the fact that if the hero puts his mouth to the ground and his teeth shake, he can invoke a kind of rebirth in strength. I suspect that the translation needs to be worked on further, but it is difficult, as there are so many words in Sumerian whose meanings are not precisely understood. Whether or not it is Gilgamesh's own mouth and teeth that are being discussed here, the fact is that Gilgamesh seeks strength by putting some teeth to the ground—either his or someone else's. As previously in the same tale, there has been the clear statement: 'The hero, his teeth are the teeth of a dragon', we may assume that Gilgamesh's own teeth are probably being referred to—his own teeth which have previously been described as being dragon's teeth.

Now in the lines following the putting of the teeth to the ground, we learn that Gilgamesh needs to summon strength by putting his teeth to the ground because he needs to fight. In the story of the Argo, Jason sows the dragon's teeth

## THE SACRED FIFTY

87

in the ground, and from them spring up armed soldiers who begin to fight—as is also the case in the story of Cadmus. So we see that in the two Greek myths, as also in this Sumerian fragment, the dragon's teeth go to the ground and a fight ensues where the hero has acquired superhuman strength. Later in this book we shall see the precise explanation of where this curious jumble originated, that it is specifically derived from an Egyptian sacred pun, and what it all means.

Meanwhile we must stay at our present level of enquiry. This book is an anabasis, or journey upward.

Let us look a little closer at the story of Jason and the golden fleece. The golden fleece was given to Phrixus and Helle by the god Hermes. The

Egyptian god Anubis became known to the Greeks as their own Hermes furthermore Diodorus Siculus (IV 47) and Tacitus (Ann. VI, 34) explain the golden fleece's origin by saying that Phrixus and Helle (who flew away on the golden ram's back to Colchis, Helle falling in the Hellespont on the way and giving that body of water its name) really sailed in a ship with a ram's head on the prow rather than having ridden the magical ram of the story. The fact that the more widespread myth which had an actual ram in the story maintained specifically that they flew on the golden ram, could refer to the idea of a celestial boat. Thus everyone is correct.

In any case, this boat would definitely have been a boat of Egypt, which to the Sumerians would have been called a 'Magan-boat', if we accept what Kramer and others believe, namely that Magan is Egypt. And the boat was a gift from Hermes – in other words from Anubis. No wonder, then, that the Sirius-related fifty is connected with the golden fleece as well as Anubis. It is worth mentioning also that the fifty Argonauts were also called the Minyae, as they were all related to each other and of the same family, descended all of them from Minyas, who had been the king of the Minyan city of Orchomenus in Boeotia, in Greece. So Jason and the Argonauts, fifty in number, all shared a kind of shadowy anonymity somewhat reminiscent of the fifty Anunnaki of Sumer, as they were often referred to simply as 'the Minyae' – a group of fifty related oarsmen in a celestial boat.

Later on we shall look extremely closely at the Argo story and also at the connections between the land Colchis, the object of its quest, and ancient Egypt<sup>9</sup> as attested for us by the historian Herodotus. But we must complete our look at the story of Gilgamesh and the Land of the Living. For even a boat is mentioned in that fragment, corresponding to the Argo. My equating a moment ago of the Argo with an Egyptian celestial barque must now be seen in conjunction with the following passage in which Gilgamesh's boat is specifically referred to as the 'Magan-boat'. I might add that the trees which Gilgamesh cut down and which his fifty companions placed in their hands according to the text were probably their oars! (The text is too broken for anything at all to be certain, even punctuation, among the fourteen lines which follow that particular passage.) Here, then, is the passage about the boat:

For me another will not die, the loaded boat will not sink.  
The three-ply cloth will not be cut,  
The        will not be overwhelmed.

House (and) hut, fire will not destroy

Do thou help me (and) I will help thee, what can happen to us?

After it had sunk, after it had sunk.

After the Magan-boat had sunk.

After the boat, "the might of Magilum", had sunk,

In the , the boat of the living creatures, are seated those who come out

of the womb

Come, let us go forward, we will cast eyes upon him,  
If we go forward.

(And) there be fear, there be fear, turn it back,  
There be terror, there be terror, turn it back,  
In thy , come, let us go forward '

I must emphasize that there is confusion here. In a footnote Kramer emphasizes that from the line 'After it had sunk' it is no longer certain that Gilgamesh is still speaking. It is not clear whether the Magan boat has really sunk or whether this is a statement injected by Gilgamesh's 'faithful servant'<sup>5</sup> who immediately before the passage just quoted had told Gilgamesh

'O my master, journey thou to the "land", I will journey to the city

I will tell thy mother of thy glory, let her shout,

I will tell her of thy ensuing death. [let her] shed bitter tears,<sup>5</sup>

What seems to happen is that Gilgamesh here tells his frightened servant (who just previously in the text is described as 'terror-stricken') that no other will die for him and that 'the loaded boat will not sink'. Then the servant would seem to break in again in his terror with his hypothetical tale to Gilgamesh's mother with 'After it had sunk', 'Then Gilgamesh again speaks, beginning with, 'Come, let us go forward'.

The phrase 'those who come out of the womb' to describe those who are seated in the Magan-boat may be meant to refer to those who are children of the goddess Nintu (also known as Ninmah, Ninhursag and Ki 'earth'). This, combined with the strange reference to teeth, seems to refer to the children of the earth-goddess springing from the womb of the earth for Ki, the earth-goddess (ki means 'earth' in Sumerian) is also Nintu or the goddess who gives birth' (Ninmah means 'the great goddess' and Ninhursag means 'the goddess of the hill, a hursag or hill having been erected by her son and she was named after it by him in commemoration of a significant mythical event; in Egypt Anubis is also called Anubis of the Hill about which I shall have much to say later on, but suffice it here to note that if the Sumerians were to speak of Anubis of the Hill they would call him Anpu-hursag).



Basically in the goddess who gives birth, and also in the earth goddess, we thus find antecedents to the soldiers springing up from the dragon's teeth sown in the earth, and also the throwing over his shoulder of the 'earth's bones' (stones) by Deukalion, the Greek Noah, with the stones becoming men much as the teeth did in the other stories. (And teeth are bones!)

In fact there are several points of contact other than this one between the Deukalion and Jason stories. For the ark of Noah is a concept which is identical with that of the ark of Deukalion, and both are magical ships in which sit 'those

## THE SACRED FIFTY

89

who come out of the womb, in the sense that they repopulate the world after the deluge. And both arks, but particularly that of Deukalion, are concepts related to the Argo. (As anyone who has read the full Epic of Gilgamesh will know, the ark of Noah in the Middle East before either the Hebrews or the name Noah even existed, was the ark of Ziusudra or the ark of Utnapishtim, and it occurs as an established element of the mythical background brought into the Epic.) For the ark of Deukalion rested on the mountain by the sacred oracle grove of Dodona, from which the Argo received its cybernetic guiding timber. Also, of course, the origin of the story of the flood and the ark (containing as it does 'archetypes' of all living creatures in pairs, and the word arche in Greek being definitely related to ark, as we shall see all too well much later in this book) is Sumerian at least, if not even before that something else (which we shall see in due course). But it was from this early source that the Greeks obtained their Deukalion and the Hebrews their Noah—both of which are extremely late forms of an exceedingly ancient story, which existed thousands of years before there were such things as either Greeks or Hebrews in existence. (Anyone really interested in the origins of Greek and Hebrew civilizations should read Professor Cyrus Gordon's brilliant book *The Common Background of Greek and Hebrew Civilizations*.)

Now the point of going into all this is really to show that the Argonaut motif of fifty heroes in a boat on a heroic quest exists in Sumer and forms a complement to the 'fifty great gods'. For if the Magan boat's fifty heroes are seated, as the Anunnaki usually are, and are 'those who come forth out of the womb', and thus children, so to speak, of Nintu, the goddess who gives birth', then they may be directly equated with the Anunnaki. For the Anunnaki, as the children of An, would also be the children of An's ancient consort Ki or Nintu. In other words, the fifty heroes are heroic counterparts of the celestial Anunnaki. The corollary of this is, that the fact that there are fifty Anunnaki is not so likely to be a coincidence as might have been thought. This brings out all the more the immense significance of the number fifty.

The number occurs also in *Gilgamesh, Enkidu and the Nether World*. There Gilgamesh dons armour which weighs 'fifty minas'. And in this tale also Gilgamesh has fifty companions. In the later Babylonian version the fifty companions are omitted from the story. At that date the true nature of the

symbolism of fifty must have been forgotten

In his book *The Sumerians*, Kramer points out<sup>4</sup> that cultic and symbolic weapons, maces with fifty heads, were fashioned by the ruler Gudea

If we return for a moment to the intriguing hursag of the Sumerians, the strange 'hill', we must recall that Ninhursag the goddess of the hill is identical with Nintu, the goddess who gives birth. Those are two separate names for the same deity. Now it is interesting to note that in Egyptian the word *tu* means 'hill', so that if we take the word *nin* which means 'goddess' and add the Egyptian *tu* we have 'the goddess of the hill', which in fact is a synonym.

This is by no means the end of this interesting investigation. For if we note that the Egyptian form of Horus (the son of Isis and Osiris) is Heru (which is a bit like Hero, isn't it?) and the traditional usage in Egyptian is to speak continually of Heru sa something which means Horus the son of something, then we shall note that the strange and puzzling word hursag might really be the

Egyptian Heru sa Agga, which means Horus the son of Agga<sup>9</sup>. It so happens that Agga is an Egyptian synonym for Anubis. And 'Anubis of the Hill' has already been mentioned. What is more, the word hursag in its older Sumerian form is indeed hursagga, as may be seen in *The Babylonian Genesis, Chapter 2*, by Alexander Heidel. A Sumerian Creation Account from Nippur<sup>1</sup>, where we read of the goddess Ninhursagga.

It also happens that Agga is in fact a reputable Sumerian name. There is in translation a short 115-line text entitled 'Gilgamesh and Agga' from the Sumerian period.<sup>5</sup> In line eighty of this text is the mention of a 'magurru-boat', which is referred to in much the same way as the Magan-boat in 'Gilgamesh and the Land of the Living'. Just as in that previous text the Magan-boat was being discussed as to whether or not it would sink, so in this latter text the magurru-boat is being discussed as to whether or not it would have its prow cut down. Curiously, as in the other tale, in this one also the boat is described as having had the worst fate actually occur, for in line ninety-eight we learn that 'the prow of the magurru-boat was cut down, just as in the previous text we read 'After the Magan boat had sunk, /After the boat, "the might of Magilum" had sunk.'

The connections between Egyptian and Sumerian words in sacred contexts become so multifold that it is impossible to ignore the continuities between the two cultures. Let us look, for instance, at the curious phenomenon of the cedar which Gilgamesh is always being claimed to have cut down. In 'Gilgamesh and the Land of the Living' Gilgamesh says 'I would enter the land of the cut down cedar' and later he is described as he 'who felled the cedar', etc. That is

an early Sumerian text. In the actual Epic proper, as we have it, Gilgamesh goes to the Cedar Mountain and says the monster Humbaba (or Huwawa) in the cedar mountain, the abode of the gods'. In Tablet V we read

[Gilgamesh] seized [the axe in (his) hand]

[     and] felled [the cedar]

[But when Huwawa] heard the noise,

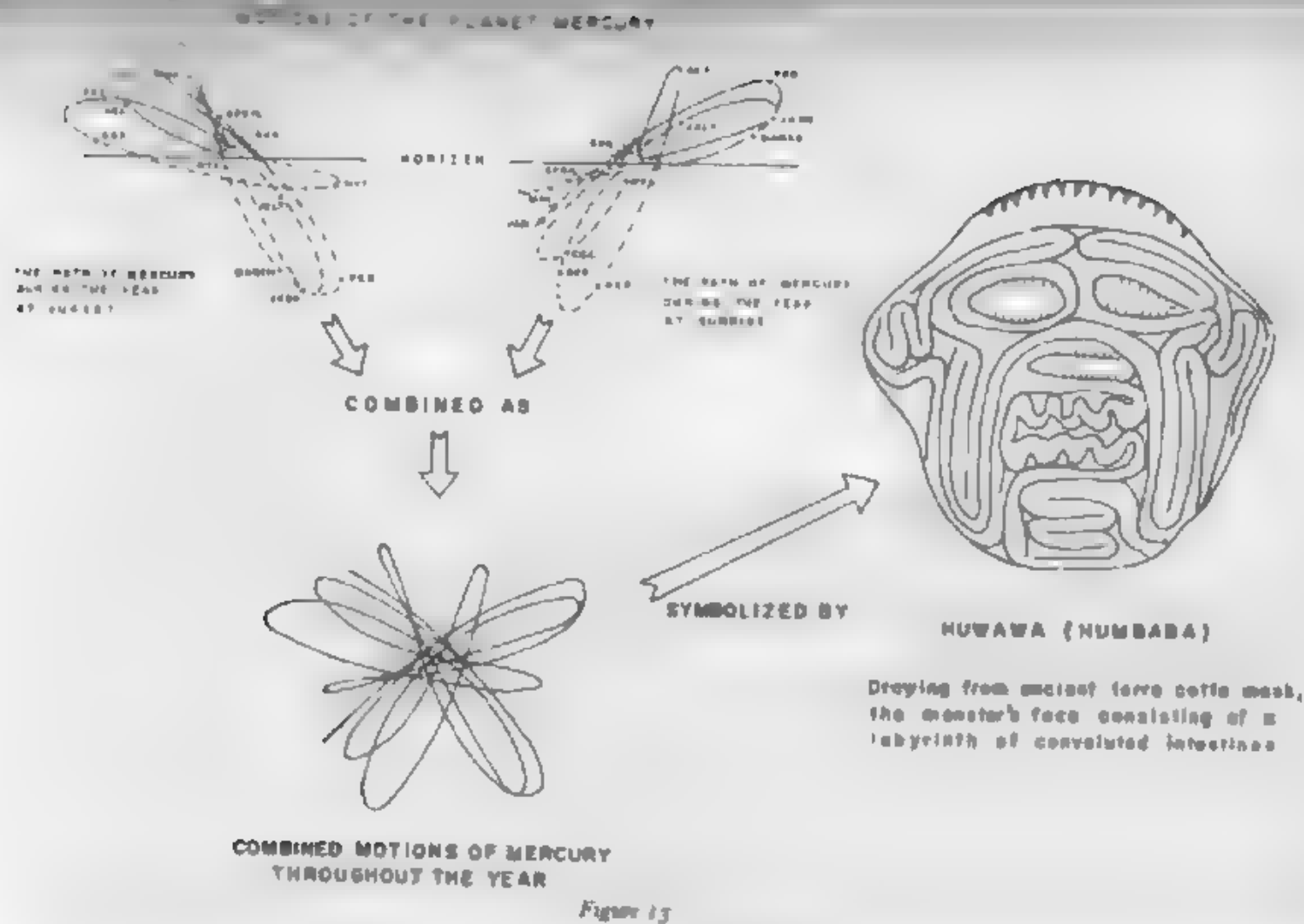
[He] became angry: "Who has [come]

[Has slighted the trees, which] had been grown in my mountains,

And has felled the cedar?"

In Chapter XXII of Hamlet's Mill, Santillana and von Dechend identify Huwawa with the planet Mercury. Now, remembering that Huwawa is also the god of the cedar forest, it is interesting to note that in Egyptian the word seb means 'cedar' and also means 'the planet Mercury'.<sup>1</sup> The subject is far more complicated than that, but I wanted to note the further source of an Egyptian pun for yet another crucial Sumerian motif. In other words, Huwawa is connected with both Mercury (the planet) and the cedar, because the planet Mercury and the cedar are both called by the same name in Egyptian – namely, seb.

Let us now put aside the enigmatic monster-god Huwawa and turn to the Epic of Gilgamesh for another purpose. But in doing so let us note Kramer's opinion in his essay "The Epic of Gilgamesh and Its Sumerian Sources",<sup>6</sup> that 'the poem was current in substantially the form in which we know it, as early as the first half of the second millennium B.C.'—



THE SACRED FIFTY

91

Let us recall that, in an early Sumerian fragment, Gilgamesh's mother was the goddess Ninsun who is versed in all knowledge and upon whose knee he wanted to sit (like Horus on the knee of Isis). In the First Tablet we read

Indeed, Gilgamesh arose to reveal dreams, saying to his mother:

'My mother, last night I saw a dream

There were stars in the heavens

As if it were the host of heaven [one] fell down to me

I tried to lift it, but it was too heavy for me

I tried to move it away but I could not remove [it]

The land of Uruk was standing around [it],

[The land was gathered around it]

[The people] pressed to [ward it],

[The men thronged around it.

[ ] while my fellows kissed its feet

I bent over it [as] [over] a woman

[And] put it at [thy] feet,

[And thou thyself didst put] it on a par with me '

There is another version of this (both as translated by Heide.)<sup>7</sup> at the beginning of Tablet II in the Old Babylonian version which is older than the above Assyrian version and preserves more of the original significance

Gilgamesh arose to reveal the dream,

Saying to his mother

'My mother, last night

I felt happy and walked about

Among the heroes

There appeared stars in the heavens

[The host of heaven fell down toward me

I tried to lift it but it was too heavy for me

I tried to move it, but I could not move it

The land of Uruk was gathered around it,

While the heroes kissed its feet

I put my forehead [firmly] against [it]

And they assisted me

I lifted it up and carried it to thee '

Kramer translates the two versions somewhat differently.<sup>8</sup> One of the most important changes occurs in his translation of what Heidel before him had rendered as 'the host of heaven'. Kramer renders 'An' not as 'heaven' but as An (or Anu), the god who was the father of the Anunnaki. And the word which Heidel renders as 'host' he comments on in a footnote at considerable length.

As regards *ki sir*, there are too many possible meanings. Furthermore, the one adopted for this passage ('the *ki sir* of Ninurta' earlier than our passage) should also apply to the war-god Ninurta, and the sky-god Anu, Enkidu, and something that fell down from heaven. The common assumption that the author may have used in these passages the same term in more than one sense is unsatisfactory.

## THE SACRED FIFTY

93

In the earlier edition I tried to justify for *kisru* the rendering 'liegeman' for the several passages in question. I now withdraw that suggestion. The correct sense, I believe, is indicated by the use of the term in medical contexts as 'concentration, essence', cf. E. Ebeling, JCS, IV (1950), 219. 'Essence', or some nuance of this term, could well be applied to deities as well as to missiles from heaven. Our poet had in mind, no doubt, some specific allusion, but the general meaning appears clear enough.

Kramer then, renders 'the host of heaven' as 'the essence of An'. He says 'Like the essence of Anu it descends upon me.' He adds another footnote to comment on the word 'it' in this sentence: 'One of the stars?'

Kramer also changes the last lines in the first version

'[I] was drawn to it as though to a woman

And I placed it at [thy] feet,

For thou didst make it vie with me.'

The emphasis here on being 'drawn to it' may be important. He continues

[The wise mother of G.gamesh, who] is versed in all knowledge,

Says to her lord.

[Wise Ninsun], who is versed in all knowledge,

Says to G.gamesh

'Thy rival, the star of heaven

Which descended upon thee like [the essence of Anu],

[Thou didst seek to lift it], it was too stout for thee

[Thou wouldst drive it off], but couldst not remove it;

[Thou didst place] it at my feet,

[For it was I who made] it vie with thee;

Thou wert drawn to it as though to a woman -'

Let us look once again at part of the second version, this time as Kramer gives it:9

'My mother, in the time of night

I felt joyful and I walked about

In the midst of the nobles.

The stars appeared in the heavens

The essence of Anu descended towards me

I sought to lift it; it was too heavy for me

I sought to move it, move it I could not"

All this, which we have examined here in two translations each of two versions, was worth seeing from these several angles. It helps us cover all the possibilities of meaning. It should be obvious that the reference is clearly to a star connected with 'the essence of Anu' which draws him towards it and is in the area of the (fifty) heroes and is super-heavy

Thus we see that in Sumer both the concepts of the heavy star (later al Wazn) and of the figure 'fifty' associated somehow with that star are present

Does this look familiar to anybody?

94

## THE SIRIUS MYSTERY

In Tablet VI of the Enuma elish we read 10 about the Anunnaki and something called 'the Bow Star' which is their brother and is in the midst of them as they are seated in the celestial regions. This Bow Star is also the daughter of Anu, who raises it up in their midst. (Remember the essence of Anu') What is being referred to seems to be Sirius. Remember the Egyptian goddess Sati (or Satis) with her bow who was one of the three goddesses (one was Sothis and the third was Anukis) riding in the celestial barque of Sothis (Sirtas). Also recall the other connections of the bow with Sirius, even in China. (And here one must refer to the book Hamlet's Mill for many examples 11) Now with particular reference to the three goddesses which Neugebauer claims are versions of Sothis ('The goddess Satis, who like her companion Anukis is hardly to be taken as a separate constellation but rather as an associate of Sothis') note the following emphasis on three names for the star, only one of which is 'Bow Star':

The fifty great gods took their seats

The seven gods of destiny set up the three hundred [in heaven]

Enlil raised the bow, his weapon, and laid (it) before them.

The gods, his fathers, saw the net he had made

When they beheld the bow, how skilful its shape

His fathers praised the work he had wrought

Raising [it], Anu spoke up in the Assembly of the gods.

As he kissed the bow: "This is my daughter!"

He mentioned the names of the bow as follows

'Longwood is the first, the second is [ ]

Its third name is Bow Star, in heaven I have made it shine '

He fixed a place which the gods, its brothers, [ ]



A footnote says of the word 'its' in the last line: Referring to the Bow, as indicated by the feminine possessive prefix in line 94 ' (In Egyptian the word Sept, which is the name of the star Sirius, also has the meaning 'a kind of wood', though whether this could be 'longwood' or not is anyone's guess ) We continue

After Anu had decreed the fate of the Bow,

And had placed the exalted royal throne before the gods,

Anu seated it in the Assembly of the gods

The phrase 'the Assembly of the gods' invariably refers to the seated assembly of the fifty Anunnaki. So it is clearly stated, we see that this Bow Star the daughter of An was placed by An on the exalted royal throne in the midst of the fifty Anunnaki. In Egypt, Isis as Sothis was also pictured as seated on a white royal throne in the heavens. She too was the daughter of the sky god. Recall also that the hieroglyph for Ast (or Isis) is a throne. And the hieroglyph for her husband Asar (or Osiris) is a throne above an eye.

Before proceeding, we had better see who 'the seven gods of destiny' are. They are often referred to as the seven Anunnaki of the underworld. This, we shall see, also relates to the Sirius question. But the use of Anunnaki in this way underscores the total anonymity of the term 'Anunnaki'. Needless to say, none of these seven Anunnaki is ever identified as an individual god. They are always 'the seven' underworld gods who determine destiny. The strictly celestial

## THE SACRED FIFTY

95

Anunnaki are also known as the Igigi. No Sumerologist has satisfactorily explained all this. It is terribly imprecise and confusing unless one had a structure to supply which fits under the cloth and matches the contours and can thereby be accepted as a tentative basis of explanation.

Now let us try to think of what we know is connected with the celestial Anunnaki and Sirius which also fits into this idea of there being seven Anunnaki gods in the underworld. Remember that in both Sumer and Egypt each god of significance in astronomical terms has his own ten-day period or week. If we multiply seven (gods) times ten days we get seventy days. Is there any basis for this length of time being of significance for the underworld in either Sumer or Egypt? Yes! In Egypt the underworld is called the Duat (or Tuat) and the seventy-day period is very significant there and relates intimately to Sirius, as we have seen in our fairytale.

Parker and Neugebauer say: 2 'It is here made clear that Sirius (Sothis) gives the pattern for all the other decanal stars.' Sirius was, astronomically the foundation of the entire Egyptian religious system. Its celestial movements

determined the Egyptian calendar, which is even known as the Sothic Calendar. Its heliacal rising marked the beginning of the Egyptian year and roughly coincided with the flooding of the Nile. (Plutarch says the Nile itself was sometimes called Sirius.) This heliacal rising was the occasion of an important feast. One can imagine a kind of New Year-cum-Easter. The heliacal rising was the occasion when Sirius again rose into visibility in the sky after a period of seventy days of being out of sight, during which time it was conceived of as being in the Duat, or underworld. A further connection with Anubis comes in here, as Anubis was conceived of as embalming Sothis for these seventy days in the Duat. But as we all know, an embalmed mummy is supposed to come alive again. And this is what happens to the mummy of Sothis. Sothis is reborn on the occasion of her heliacal rising. Parker and Neugebauer also say: "During the entire time of its purification it (Sothis, the star) was considered dead and it was only with its rising again out of the Duat that it could once more be considered as living."

The Egyptians stubbornly clung to the traditional seventy days as the prototype of an underworld experience, despite its inconvenience, and, as we have already seen, 'Sirius gives the pattern for all the other decanal stars'. In fact, it was the practice through all of Egyptian history for there to be a period of precisely seventy days for the embalming of a human mummy—in imitation of Sirius. Even during the late Ptolemaic period, the embalming process invariably lasted the precise period of seventy days.

Thus we find the explanation of the seven Anunnaki of the underworld. It is also interesting to note that in ancient Mexico the underworld was thought to have seven caves.

It is worth noting that in the story Etana,<sup>14</sup> about the legendary King Etana, not long after the Great Flood, who had to ascend to heaven in order to have something done about his inability to have children (and thereby managed to have a son and heir), mentions the divine Seven and describes them as Igigi, emphasizing the apparent interchangeability of the terms Igigi and Anunnaki. Also 'the great Anunnaki' are described as 'They who created the regions, who set up the establishments'.

In the 'Descent of Ishtar to the Nether World'<sup>15</sup> the Anunnaki are described as being brought forth (they are referred to as if they were stuffed animals being brought out of a closet, dusted off, and displayed in a taxidermists' contest) and seated on thrones of gold. Once more the throne concept appears. It seems all the Anunnaki ever do is sit and be symbolic.

Good little Anunnaki, like poodles, sit and smile at Anu. They are never given personalities, poor fellows. I might mention that in this story the nether

world is described as having seven gates leading to seven successive rooms (or caves). It is obvious that the period of seventy days during which Sirius was 'in the underworld' to the Egyptians led to a breaking down of the seventy days into ten-day weeks, each with a god, giving seven gods. But these seven gods of the underworld must not have personalities lest there be the distraction of personal qualities to detract from the purely numerical significance of the concept. And of course the seven rooms of the seven gods are successive leading from 'week' to 'week' until Sirius again rises. So we see yet another essential link between the early Sumerian concepts and the Egyptian concepts. When will Professor Neugebauer take notice of this and cease rummating among the late Babylonians and Persians?

In later times the god Marduk usurped the central position of the pantheon from all the other gods in Babylon. The Enuma elish is largely a description of this process and is basically written to Marduk, telling of his honours. This was quite an innovation, a real centralization of power. 'The black headed people' which is how the Sumerians usually referred to themselves in their writings (when the context is sufficiently pious they meekly call themselves the 'clouded', it is also interesting to note that the Egyptians were known as the 'melampodes' or 'the black footed people' to the Greeks!) obviously didn't take to the rise of Marduk with unanimous acclaim. In many ways the Enuma elish is a blatant propaganda tract for Marduk, alternately trying to convert and to denounce the people. Here we see the author trying to woo them. 16

Let his sovereignty be surpassing having no rival

May he shepherd the black headed ones, his creatures

To the end of days, without forgetting, let them acclaim his ways

Here, however, we see a more authoritarian approach, where the sugary smile dissolves

May he order the black headed to re[vere him],

But the next moment, compromise comes again in the form of a mock tolerance

Without fail, let them support their gods

Their lands let them improve, build their shrines,

Let the black headed people wait on their gods

In other words, the author despairs and goes into a sulk. For his next words indicate the sentiment, 'We don't need them, we'll go it alone

As for us, by however many names we pronounce it, he is our god'

Let us then proclaim his fifty names!

## THE SACRED FIFTY

97

In other words, the supporters of Marduk thought the best way to glorify their god was to give him fifty names. Then, with any luck, he would be omnipotent.

As Marukka, Marduk gladdens the heart of the Anunnaki, appeases their [spirits]. All the fifty names are given, along with short comments following each. In a footnote Speiser says, revealingly, that "The text etymologizes the names in a manner made familiar by the Bible; the etymologies, which accompany virtually every name on the long list are meant to be cabalistic and symbolic rather than strictly linguistic, although some of them happen to be linguistically sound."

The list ends and we read in the text:

With the title 'Fifty' the great gods

Proclaimed him whose names are fifty and made his way supreme.

This final note adds a last flourish of emphasis to the importance to the supreme god of the title 'Fifty' as well as the designation by fifty names.

There is one cluster of names among the fifty given which is of particular interest. They are Asaru, Asaralim, Asaralimnuna, and the group of three centred round the similar name Asarulu (the other two being Namtaku and Namru). I suspect these names of being related to the Egyptian Asar (Osiris). We have already seen how the An of Egypt was known in Sumer not only as An but as Anu, picking up a 'u' ending. It is therefore not so senseless to see in Asaru a Sumerian form of Asar, with the same 'u' ending added. But the Egyptians themselves also had an Asaru, or more precisely, an Asar-uu, whom Wallis Budge describes as 'a form of Osiris worshipped in lower Egypt'.

Since Asaru in Sumer corresponds to Asar-uu in Egypt, what about the Sumerian Asarulu? In Egyptian a vegetative Osiris would be known as Asar-ruti, but as is well known, the liquid V and L are in Egyptian entirely interchangeable and represented by the same hieroglyph. So Asar-ruti could just as well be Asar-luti, and the lingual 'r' as opposed to a dental 't' is pronounced rather like a 'd', being a softer sound. If we merely transmute it thus, we have Asar-ludu. It would mean, 'Osiris of the growing plants'. And in fact, in the Sumerian text, we find Asaru described as 'bestower of cultivation, creator of grain and herbs, who causes vegetation to sprout'.

Immediately after one of the Asaru names of Marduk in the Enume elish

we find that his thirteenth name is Tutu. It so happens that Tutu is the name of an Egyptian god. Wallis Budge describes him as 'a lion-god, son of Neith (Wallis Budge says that Neith was 'One of the oldest goddesses of Egypt. She was the goddess of hunting and weaving, but was identified with many other goddesses such as Isis, Men-wrt, and their attributes were assigned to her' 17). There is even an Egyptian precedent for the use of Tutu as one name of a god who has many names. The Egyptian monster of darkness, Apep, possessed many names, to destroy him it was necessary to curse him by each and every name by which he was known. To make quite sure that this should be done effectively the Papyrus of Nes-Amun adds a list of such names, and as they are the foundation of many of the magical names met with in later papyri they are here enumerated. 18 And one of these is Tutu. Surely this almost identical preoccupation with the need to enumerate every one of the magical names of a

god in both countries must have common origins—especially as the name Tutu is in the lists of both countries.

It is important to look even closer at the Egyptian god Tutu. In Heide's translation of the Enuma elish he gives for Asarludu the early Sumerian epithet namshub as opposed to the late Babylonian form namru—both meaning 'bright' and in the text further explained as, 'The bright god who brightens our way'. In a footnote Heidel explains: 'The poets are here apparently playing on the Sumerian term shuba, which is equated with the Babylonian words ebbu, ellu, and namru, all of which mean "bright"'. 5 Now, what is so interesting is that in Egyptian the word shu means 'bright' and also describes the sun god—who is indeed a 'bright god who brightens our way'. So we see that shu in Egyptian means the same as shuba in Sumerian. Furthermore, both are made to apply to a description of the sun. Also the Sumerian shuba is made to refer to Asarludu, and we may now take note of the further surprising fact that the Egyptian god Tutu is, according to Wallis Budge, 'a form of the god Shu, whose symbol was a lion walking'. 19

So as we examine the material we find an increasingly complex weave of common patterns in Egypt and early Sumer both linguistically and in religion-astronomy. Later in the book we shall see this all reach a meaningful climax.

## Notes

1. In Pritchard, *Ancient Near Eastern Texts*.

2. Also in Pritchard, *ibid*.

3. Pub. by W. W. Norton & Co., New York, 1965. An earlier edition of this book had a different title: *Before the Bible*.

4. The Sumerians, University of Chicago Press, 1963, p. 67
5. Also in Pritchard, op. cit.
6. Journal of the American Oriental Society, 64 (1944), p. 11
7. Heidel, Alexander, The Gilgamesh Epic and Old Testament Parallels, University of Chicago Press, 1970
8. Pritchard, op. cit.
9. Ibid.
10. Ibid. Also see p. 514, Addenda: New Text Fragments, in same vol.
11. de Santillana, Giorgio, and von Dechend. Hertha, Hamlet's Mill. Macmillan & Company Ltd, London, 1969
12. Egyptian Astronomical Texts, Vol. I, p. 74
13. Ibid., p. 73
14. Pritchard, op. cit., p. 114
15. Ibid., p. 106
16. In Pritchard, ibid.
17. Book of the Dead, trans. by Wallis Budge, p. 176, n.
18. Wallis Budge, The Gods of the Egyptians, Vol. I, p. 326
19. Wallis Budge, op. cit., Vol. I, pp. 463-4

## SUMMARY

'The Black Rite' concerned something called 'Night' which was apparently an object that moves in heaven along with the other mysteries in turn that move in heaven, with ordered motions and periods of times. It has less light than the sun and it 'weaves a web with rapid light.

## THE SACRED FIFTY

99

Sirius B moves in heaven with ordered motion and period, has less light than our sun, and distinctly weaves a web with its rapid motion, since it revolves round Sirius A in much less time than the planets Uranus, Neptune, and Pluto revolve around our own

SUN

'Night' may thus refer to Sirius B, just as may 'black Osiris' and 'invisible Nephthys'

In really early times the basic concepts of Egyptian astronomy and Sumerian astronomy were identical. Later many differences appeared. Authorities on ancient astronomy tend to give short shrift to the earlier times, hence the similarities between the two cultures in this particular field have tended to go unremarked.

In Egypt and Sumer (Babylonia) there were identical systems of dividing the calendar year into twelve months each composed of three weeks which lasted ten days apiece. Each week had a constellation of the night sky associated with it (which in modern parlance we might describe as 'being a kind of zodiac'). Thirty-six of these weeks added up only to 360 days, which was less than a year, so the 365-day year was obtained by adding on five extra days at the end.

Identical systems of such complexity in these two cultures mean that the relationship between Egypt and Sumer must be explored further.

In Sumer the 'fifty great gods' called the Anunnaki were anonymous as individuals and only ever spoken of as 'the fifty great gods' with the emphasis on their number. They were literally restricted to the level of being a numerological cipher. They are continually invoked and are of importance, but they never did anything but sit on their thrones and 'be fifty'.

In an early Sumerian tale of their epic hero Gilgamesh, we find him accompanied in his adventures by fifty heroes, reminiscent of the fifty Argonauts who accompanied Jason. His teeth are the teeth of a dragon' we are told, reminiscent of Jason sowing the dragon's teeth. And Gilgamesh also puts his teeth to the ground (that much we can gather, but the passage is obscure and he may really be sowing teeth). Each of his fifty heroic companions carries a specially felled tree for the journey, and the only reasonable purpose to go around carrying a tree seems to be that these trees were used as oars, especially as there is an association with a boat. This again is like the Argonauts. We thus seem to have found a Near Eastern tale from which the tale of the Argonauts was derived two thousand years or so later by the Greeks.

Gilgamesh somehow derives strength from putting his teeth to the ground. In the Greek tale, Jason sows the teeth and they sprang up as strong soldiers, another parallel.

Anubis, who is now familiar to us from Egypt, was identified by the Greeks with their own god Hermes (known in Latin as Mercury). Hermes turned the Golden Fleece to gold originally, in the Greek myth. It was this same Golden Fleece that Jason and the Argonauts sought in their quest, and which they succeeded in seizing and taking away with them.

In the early Gilgamesh tale of the Sumerians, Gilgamesh and his fifty proto-Argonauts have some connection with a ship (the text is tantalizingly fragmented), called 'the Magan-boat'. It should be remembered that Magan is the Sumerian name for Egypt.

Hence the boat is connected with Egypt

All the Greek Argonauts were related to one another and more or less anonymous as individuals – reminiscent of the earlier Sumerian 'fifty heroes' accompanying Gilgamesh and also the 'fifty great gods' known as Anunnaki

The Greek ark of Deukalion came to rest after the Flood at Dodona, from where the Argo received its guiding timber. The ark and the Argo apparently were related in other ways too.

Professor Cyrus Gordon has written an important book on common origins of Greek and Hebrew cultures from the Egyptian-Sumerian milieu of the cosmopolitan world of the ancient Mediterranean (see bibliography)

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## THE SIRIUS MYSTERY

The 'fifty great gods' of Sumer, the Anunnaki, are invariably seated. Sacred oarsmen or Argonauts are also, of course, invariably seated while they are rowing. 'The fifty who sit' and 'the fifty who sit and row' seem to be a motif.

The other element besides the eye in the Osiris-name hieroglyph is the throne which is the hieroglyph for Isis as well. The throne is a divine seat. The Sumerians frequently intoned of the Anunnaki that they were 'they who are seated on their thrones', or sometimes for a bit more drama, 'the fifty great gods took their seats'. (Of course they did nothing even then.)

The Egyptian Anubis (Anpu) was a god 'of the hull'. The Sumerian god Anu's wife was a goddess 'of the hull'.

The older form of the Sumerian word for hull, hursagga, may be derived from the Egyptian Heru-sa-agga, where 'agga' refers to Anubis (who was 'of the hull'). There are many other word and name similarities between Egypt and Sumer.

In the Epic of Gilgamesh a dream of Gilgamesh is described where he encounters a heavy star that cannot be lifted despite immense effort. This star descends from heaven to him and is described as connected with Anu (who is the god of heaven). Thus we find 'the heavy star' concept in Babylonia long before the Arabs even existed and were to have their star in the Great Dog (and the other in Argo) called 'Weight' and described as 'the heavy star'.

Gilgamesh is drawn to this heavy star irresistibly in a manner described in a way that seems to hint at a kind of gravitational attraction (to those, that is, who are conscious of a 'heavy star' like Sirius B being gravitationally powerful as well as 'heavy').



The Epic of Gilgamesh refers to 'the essence of Anu possessed by the star'. The word rendered as 'essence' is used elsewhere in medical contexts referring to 'concentration, essence' - an intimation of 'super-dense matter'. This 'concentrated star essence of Anu' was too heavy for Gilgamesh to lift in his dream.

It must be recalled that Gilgamesh had his fifty companions in the early versions of the Epic (they were discarded later, by Babylonian times). Hence connected with Gilgamesh we find (a) Fifty anonymous companions seemingly important only as a numerical element in the story and in later times discarded as useless, (b) A super-heavy star connected with An (also an Egyptian name of Osiris, husband of Isis who was identified with Sirius), (c) A description of the star as being composed of a 'concentrated essence' and of having extreme powers of attraction described in a manner reminiscent of gravitational attraction.

These elements comprise almost a complete description of Sirius B - a super-heavy gravitationally powerful star made of concentrated super-dense matter ('essence') with the number fifty associated with it (describing its period?) - and connected with An (Anu), which we know to be linked in Egypt (and Gilgamesh's Magan-boat seems Egyptian) with Sirius.

## CHAPTER FOUR

### The Hounds of Hel.

Since Sirius is the Dog Star, let us turn to the dog-headed Sumerian goddess Bau. According to Thorkild Jacobsen,<sup>1</sup> 'Bau seems originally to have been goddess of the dog and her name, Bau, to have constituted an imitation of the dog's bark, as English "bow-wow"'. \* Bau was also the daughter of An. So here the dog-goddess is the daughter of An, whereas in Egypt the dog-god was himself An-pu (Anubis). Since An is connected with Sirius, we should thus not be surprised that he has a dog-goddess for a daughter in Sumer. Sirius as the Dog Star was a tradition which was not thought to have existed in Sumer, however before now.

Since the fifty Anunnaki were children of An, and Bau is a daughter of An, it is not far-fetched to see in Bau a survival (for she is an old goddess who faded into obscurity in later times) of the concept of a dog-star goddess equivalent to his as Sothis. And it is interesting that she was dog-headed. For Anubis was not entirely a jackal or dog, he was merely jackal- or dog-headed.

Bau's husband Ninurta was the son of Enlil. Just as Marduk usurped the position of chief god, at a somewhat earlier time Enlil had usurped this position from An. (The situation is analogous to Greek mythology where Cronos usurped the position of Uranus and was in turn overthrown by Zeus.) There is an interesting 170-line hymn to Enlil<sup>2</sup> which seems to describe a stellar abode for the god. The 'lifted eye' or 'lifted light scanning and searching the lands' sounds reminiscent of the Dogon concept of the ray of Digtaria which once a year sweeps the Earth. In any case, a 'lifted light' which searches and scans is de-

finitely a beam or ray and is in its own right an interesting concept for the Sumerians to have had as situated in the celestial abode. I must emphasize in advance for the reader that lapis lazuli was considered by the Sumerians to represent the night sky. Here then are significant excerpts from the hymn.

Enlil, whose command is far-reaching, whose word is holy,

The Lord whose pronouncement is unchangeable, who forever decrees

destinies.

Whose lifted eye scans the lands,

Whose lifted sight searches the heart of all the lands,  
Enlil, who sits broadly on the white dais, on the lofty dais

\* In Egyptian a word for 'dog jackal', is Auau, which probably has the same 'dog's bark'

derivation as the Sumerian Bau.

.02

## THE SIRIUS MYSTERY

The lofty white dais of Sothis- Sirius is an Egyptian concept. It is Ast (Isis). It is also Asar (Osiris), with the addition of a hieroglyphic eye. Later we find in this hymn from Sumer the city of Nippur's temple in comparison.

Nippur the shrine, where dwells the father, the 'great mountain

The dais of plenty the Ekur which rises

The high mountain, the pure place

Its prince, the great mountain, Father Enlil

Has established his seat on the dais of the Ekur, lofty shrines,

The temple its divine laws like heaven cannot be overturned,

Its pure rites, like the earth cannot be shattered,

Its divine laws are like the divine laws of the abyss, none can look upon

them.

Its heart' like a distant shrine, unknown like heaven's zenith

And:

The Ekur, the lapis-lazuli house, the lofty dwelling place, awe-inspiring

Its awe and dread are next to heaven,

Its shadow is spread over all the lands

Its lofulness reaches heaven's heart

These mentions of the lapis lazuli aspect of Enlil's abode and also that it reaches heaven's heart make quite clear that we are not merely dealing with a solar description. It is not the sun but a stellar abode that is being distinctly described. Hence the references to the ray or beam are all the more curious as they do not refer to the sun's light as might have been thought from a superficial reading. We continue:

Heaven he is its princely one, earth he is its great one

The Anunnaki he is their exalted god

When in his awesomeness, he decrees the fates,

No god dare look on him

Here we see Enlil has been called the exalted god over the Anunnaki (in other texts his son Enki, or Ea, boasts that he is their 'big brother' and leader). Here Enlil has also himself been given the power of decreeing the fates, which the Anunnaki traditionally do themselves. In the fourth line from the end above, 'heaven' is An and 'earth' is Ki. An and Ki were married. The compound an-ki is Sumerian for 'heaven-earth' and is the word meaning 'universe'. Note the similarity between an-ki and the name of the Egyptian goddess Anukis who is identified with Sothis-Sirius. Also, of course, the similarity to the name Anunnaki.

So we find the above stellar descriptions of Enlil, the father-in-law of the dog-headed goddess we tentatively identify with Sirius. And we find those fifty irrepressible Anunnaki creeping in again. They manage to turn up every where, given half a chance, when the subject of Sirius comes up.

Now the many similarities between Sumer and Egypt which we have so far noted (with more to come), which have led us to consider the possibility of the two nations having been in some way linked, may be referred to in a most interesting passage from Josephus,<sup>3</sup> in which 'the children of Seth' are mentioned. Many ancient writers supposed Seth to have been Hermes Trismegistus.

## THE HOUNDS OF HELL

103

This fact may suddenly be more important in the light of what we have begun to suspect about a scantily surviving authentic Hermetic tradition (maligned and obscured by a welter of useless, trivial, co-survivals from later times).

Here is the passage

'The children of Seth' were the inventors of that peculiar sort of wisdom which is concerned with the heavenly bodies, and their order; and that their inventions might not be lost before they were sufficiently known, upon Adam's prediction, that the world was at one time to be destroyed by the force of fire, and at another time by the violence and quantity of water they made two pillars, the one of brick, the other of stone. They described their discoveries on them both, that in case the pillar of brick should be destroyed by the flood, the pillar of stone might remain, and exhibit those discoveries to mankind, and also inform them that there was another pillar of brick erected by them. Now this remains in the land of Syria or Seirad to this day.

This passage calls forth many comments. The point which immediately springs to one's notice is that there is a 'pillar of brick' in the land of Syria, or in the land of Sumer-Akkad-Babylonia. Well, this is the very land of brick! It is the land of the brick ziggurat or 'great mountain' - a giant pillar if you like. But where is the land of stone? Why, it is obviously Egypt, the land of the great stone pyramids. Here, then, is a description of two linked cultures, one building brick edifices and the other building stone edifices. In Egypt we have the Great Pyramid, which so many people have believed to contain in its basic construction the proportions and measurements to demonstrate that it was constructed by highly advanced and civilized men. The great ziggurats of Babylon and other cities, too, though in a more ruinous state, seem to embody in their construction much that is profound. Can it be that Josephus has preserved a tradition of the link between Egypt and Sumer and their respective types of building? He says the link was an astronomically defined one. 'The children of Seth first possessed that peculiar sort of wisdom which is concerned with the heavenly bodies. Well, we have already discovered for ourselves that the fundamental astronomical and astronomical-religious concepts were common to earliest Egypt and Sumer. And here is Josephus telling us the same thing, and what is more, telling us what the treatise 'The Virgin of the World' would have us know - that it all began with Hermes Trismegistus in the way we have previously discussed.

But now let us pursue other relevant ramifications of Egypt found elsewhere. And let us do so by returning to the subject of the Argo and the fifty Argonauts, who were all Minyae (descendants of Minyas), who were led by Jason (also a descendant of Minyas) in the quest for the golden fleece at the mysterious land of Colchus, which actually existed and was just about as strange a locale as one could wish. For if you sail through the Hellespont (named after Helle, who fell from the golden ram) into the Black Sea (called the Euxine Sea by the Greeks), and follow the coast of present-day Turkey until you come to the region of the border with the Soviet Union of today, you will have come to Colchis. It is a pretty strange place for the Greeks to attach so much importance to. It sits at the foot of the formidable Caucasus Mountains and not far

## THE SIRIUS MYSTERY

away are the Georgian people who live in their mountains to such amazing ages as a hundred and ten, with a culture peculiarly their own. Not far to the south is that strange place, Mount Ararat, where the ark of Noah landed after the Flood. Surely this is a most unusual land, and far removed from the Greek world. Or is it?

Minyas had a great grandson called Phrixus. Phrixus had four sons who lived in Colchis, to which he had fled on the back of the golden ram and where he gave the golden fleece to the local King of Colchis, and in return was made welcome and married the king's daughter. It is obvious that these four sons were only half-Colchian and would feel some loyalty towards their father's homeland which was in mainland Greece. Sure enough, on his deathbed Phrixus asked his sons to return to Orchomenos, his home in Greece, to reclaim their birthright there. This they agreed to do. For Phrixus's father had been the King of Orchomenos (as had Minyas), and these sons should be able to claim what honour and position (not to mention more material matters) was rightly theirs. However, they knew that setting things straight might be a bit difficult, as their father and his sister Helle (who fell into the Hellespont) had left in rather a hurry on the golden ram with the blessing of Hermes, but not with too many tears being shed in Orchomenos at the time.

So these four sons set out and were shipwrecked but were fortunately picked up and rescued. Who rescued them? None other than our fifty Argonauts who were just passing. In fact, these Argonaut cousins of theirs were at that moment just happening by on their way to Colchis where their mission was to try to get that fleece back. The four young fellows had no objection to such a plan, especially as they were also descended from Minyas. The Argonauts had been losing some of their men (for instance, Hercules and Hylas had vanished, Hylas was dragged down into a stream by a passionate water nymph and Hercules went berserk and wandered off into Turkey calling his name in vain, later founding cities and doing various Herculean things). So these four fellows from Colchis were just the thing to recharge the ranks.

But what about this place Colchis? Perhaps if we examine it we shall find some Egyptian connections. Anything seems to be possible in a magical land like this.

In fact if we look at the Histories of Herodotus<sup>4</sup> we read: It is undoubtedly a fact that the Colchians are of Egyptian descent, I noticed this myself before I heard anyone else mention it, and when it occurred to me I asked some questions both in Colchis and in Egypt, and found that the Colchians remembered the Egyptians more distinctly than the Egyptians remembered them. The Egyptians did, however, say that they thought the Colchians were men from Sesostri's army.<sup>5</sup> This Sesostri is identified tentatively by scholars with Ramses II. Herodotus continues

My own idea on the subject was based first on the fact that they have black skins and woolly hair (not that that amounts to much, as other nations have the same), and secondly, and more especially, on the fact that the Colchians, the Egyptians, and the Ethiopians are the only races which from ancient times have practised circumcision. The Phoenicians and the Syrians of Palestine themselves admit that they adopted the practice from

## THE HOUNDS OF HELL

.05

Egypt, and the Syrians who live near the rivers Thermodon and Parthenius. I learnt it only a short time ago from the Colchians. No other nations use circumcision, and all these are without doubt following the Egyptian lead. As between the Egyptians and the Ethiopians, I should not like to say which learned from the other, for the custom is evidently a very ancient one; but I have no doubt that the other nations adopted it as a result of their intercourse with Egypt, and in this belief I am strongly supported by the fact that Phoenicians, when they mix in Greek society, drop the Egyptian usage and allow their children to go uncircumcised.

And now I think of it, there is a further point of resemblance between the Colchians and Egyptians: they share a method of weaving linen different from that of any other people; and there is also a similarity between them in language and way of living."

So here we see a probable (indeed, almost entirely certain) explanation for the connection of Colchis with the Argonaut story. No wonder the Hermes-given (which is to say, Anubis-given) golden fleece was at Colchis. For Colchis was a thoroughly Egyptian country. But because the heroes of a Greek tale must be Greeks and not Egyptians, the Argonauts are all Minyae from Greece. The familiar anonymity of 'the fifty' witnessed by us with the Anunnaki of Sumer, prevails here among the Argonauts as well. Different epic poets who treated of the tale chucked in various epic heroes. In the main surviving Argonautica by Apollonius of Rhodes, Orpheus and Herakles (Hercules) are among the crew, though Hercules is left behind as I have just said. In fact, Hercules was so obviously borrowed for his 'box-office draw' as a 'guest star' in a cameo performance that we can't really take the matter seriously.

On with the story and those Argonauts. I said that Orpheus was included in the cast by that great film producer Apollonius of Rhodes. But another competing film producer, Pherecydes, insisted that Orpheus was not an Argonaut. Diodorus Siculus, a great supporter of women's lib, maintained that Atlanta was an Argonautess. Apollonius says pointedly that super star Theseus was in Hades at the time and otherwise engaged (with another contract) but Statius (who was obviously with the other studio) later made Theseus an Argonaut anyway. H. W. Parke has pointed out that the Apolline seers were apparently

injected into the Argonaut story as a propaganda effort by the rising power of the Delphic Oracle which was trying to squeeze out the premier oracle of Dodona and achieve first place for itself in the eyes of the Greek public

Parke has shown how the really central oracular elements in the Argo story were all related to Dodona, not Delphi. Delphi was quite an upstart in the centuries immediately preceding the classical period, and initially was not more important than Dodona, though it was to become so and held precedence by the time of Socrates and the classical Greeks. Parke concludes that all the Delphic and Apolline elements in the Argo story are late accretions from the time after Delphi had usurped the primacy of Dodona. They would not have been in the Argo epic referred to by Homer, who proves the antiquity of the Argo saga by his mention in the Odyssey (XII, 69-72) of 'the celebrated Argo' and of Jason and the Clashing Rocks. Significantly, no other

\* Circumcision is absolutely fundamental to Dogon culture for religious reasons

.06

## THE SIRIUS MYSTERY

Argonaut is mentioned by name by Homer. It is obvious, in fact, from what I said above, that the Argonauts were primarily noted for being fifty in number and related (a comfortable kind of anonymity - cousins'). Outstanding Hellenic heroes were thrown into their ranks by the caprices of successive epic poets to provide recognizable colour. With the exception of Jason there is total disagreement among everyone concerned about just who were the Argonauts. And according to Robert Graves in *The Greek Myths*, Jason was originally Hercules. And Hercules was originally Briareus. Of course, the answer is that they were not individuals and were not meant to be.

They were fifty and they were related and usually seated and they sailed in a magic boat. Just like the Anunnaki, and just like the fifty anonymous companions of Gilgamesh! And in the Gilgamesh fragments from the early Sumerian times, the boat mentioned is a Magan-boat - or Egyptian boat. It must be remembered also that Sumer is located between Egypt and Colchus.

We are now beginning to get down to the bare bones of the Argo story. I don't believe that the earliest levels of this ancient tale have ever previously been reached.

Not only Herodotus, but Pindar as well, describes the Colchians as dark. In his IVth Pythian Ode, which is largely about the Argonauts, Pindar says (212) 'Among the dark-faced Kolchians, in the very presence of Aeetes'. Pindar therefore confirms Herodotus on this point.

It remains to attempt a dating. If Herodotus is correct and the Gocharians were Egyptian soldiers dating from the reign of Sesostris (Ramses II), then they would have gone to Colchis at some time during the years 1300-1234 B.C., which is estimated by John A. Wilson<sup>5</sup> as the period of the reign of Ramses II. This dating is only of use as an indicator of the general antiquity of the origins of our material. There does not seem to be any archaeological information of any kind from the undiscovered site of Aea, the capital city of Colchis, which is on the coast of the Black Sea (just by a river known anciently as the Phasis), just across the border of the Soviet Union from Turkey. I would suspect the site of Aea has never even been sought! It would certainly make an interesting site for excavation. It would presumably offer an unusual amount of Egyptian style material mixed with Armenian-Caucasian styles. It should be extraordinarily interesting from the point of view of ancient art, almost certainly being quite rich in precious metals and beautiful metal working, particularly gold. We shall see later in this book that it was near a famous ancient metallurgical centre. And, of course, there should be finds which would confirm Herodotus's account.

Here is a description of the site, for those who wish to seek it: 'They reached the broad estuary of the Phasis, where the Black Sea ends — and then rowed straight up into the mighty river, which rolled in foam to either bank as it made way for Argo's prow. On their left hand they had the lofty Caucasus and the city of Aea, on their right the plain of Ares and the god's sacred grove, where the snake kept watch and ward over the fleece, spread on the leafy branches of an oak.' (Another hint of Dodona, with the oak and the grove. This similarity will be seen to become extremely relevant later on.)

To return to the question of dates (also bearing in mind Homer's early casual reference to 'the celebrated Argo'), we will recall my mention of dates when I

## THE HOUNDS OF HELL

107

showed the identical nature of the Sumerian and Egyptian astronomical systems in their essential details. I pointed out then that the Babylonian tablets were dated from the second millennium B.C., giving us an upper limit on time in the Sumerian region. The Egyptian star clocks to which they bear such total resemblance calendrically had already altered (such as by the introduction of a fifteen-day week instead of a ten-day one, indicating the advanced degeneration of the traditions) in Egypt in the first millennium B.C.

Hence we see that the Egyptian star clocks no longer existed in the necessary form by the first millennium, giving us an upper limit date in Egypt of the end of the second millennium B.C. — identical with the upper limit we have in Sumer. I am tempted now to steal a phrase of the physicists and remind the reader that these dates are of an order of magnitude comparable with the date of Ramses II's reign adopted tentatively for the settlement at Colchis of Egyptian colonists. Surely these three dates cannot coalesce accidentally round the same material! We have no choice but to adopt the approximate date of c. 1200 B.C. as the upper limit for the spread (and subsequent degeneration) of



our Sirius-related material throughout the Mediterranean area, from which ever source it originated

It may perhaps be of some relevance that this coincides roughly with the end of Minoan domination of the Mediterranean. From the point of view at least of the spread of the Sirius material I would connect it with what seems to me an obvious fact that when Minoan sea power, based on Crete, collapsed, the Egyptians and inhabitants of the Near East could and did expand their own maritime activities to fill the vacuum left by the disintegration of the Minoan fleets (An alternative but unlikely suggestion is that fleeing Minoans dispersed their culture with them as they settled in exile in different areas of the Mediterranean following the collapse of their nation but I do not believe they alone were the source of the Sirius material.)

I am inclined to believe the increasingly strong and accumulating evidence that the Minoan culture was dealt a death blow by eruptions of the volcano Thera. F. Matz, in *Minoan Civilization: Maturity and Zenith* in the *Cambridge Ancient History*, says: 'The peaceful transfer of power in Crete from the Minoans to the Mycenaeans is difficult to explain.' But not, surely, if volcanic eruptions had enfeebled the Minoans. The Minoan cities had no walls. On their island the Minoans relied, it seems, on their unchallenged sea power to keep enemies at bay, just as the Spartans in their unwalled city of Sparta in mainland Greece relied on their unchallenged land power to keep enemies at bay in late classical times. For the Cretan island could not be reached by enemies on foot, and as the Minoans had total naval superiority they could not be threatened at home. The latest conclusions about Thera seem to be that the towns on that small volcanic island near Crete were first evacuated due to earthquakes some years before the final volcanic eruption which destroyed Minoan civilization.

Herodotus in Book I of his *Histories* gives us a good illustration of how hopeless it is for a land power to challenge a sea power on the sea, when he shows the landlubber Lydians abandoning their plans to build ships and extend their conquests to the islands because they are aware they just don't know what they're doing. If the Minoan fleets had been sunk in great tidal waves following volcanic eruptions, the Minoans would have had no choice but to come to an

.08

## THE SIRIUS MYSTERY

understanding with the Mycenaeans. Any other possibility would have meant suicide. Probably they made a graceful and dignified pact or series of pacts which made the inevitable seem voluntary. And if the Mycenaeans were traditionally a good bit in awe of the more sophisticated Minoans, so much the better for the Minoans who 'condescended' to come to terms like gentlemen.

But the 'spheres of influence' of the sea-going Minoans could not be taken over immediately by the Mycenaean, who lacked the maritime skill (not to mention ships) to complement on the waves their success in overrunning most of the island of Crete, probably leaving certain areas to the native Minoans according to the pacts I have suggested. It is not that the Mycenaeans would have lacked the energy or will, but the Minoan fleets would have been destroyed and even the most willing Minoan sailors could not sail non-existent ships for the Mycenaean invaders. Furthermore, the work of consolidating power on the recently taken island would have been a protracted and distracting matter for the Mycenaeans. So, for all these reasons, the new Cretan rulers could not attain to the full stature of their predecessors and be in complete command of the Mediterranean Sea.

The Mycenaeans had been competing with the Minoans (and raiding them, apparently under Theseus) as best they could for some time before the cataclysm. In fact F. H. Stubbings<sup>6</sup> informs us that the Minoans made a 'disastrous Sicilian expedition' against the Mycenaean trading interests in the central Mediterranean. This is reminiscent, of course, of the famous Athenian expedition to Sicily which was a total disaster and caused Athens to lose the Peloponnesian War. Sicily was thus responsible for two great historical disasters that altered the course of events to an unknown extent elsewhere than in Sicily.

So we see the Minoan power may already have been declining. Stubbings says: 'All that is really certain, however, is that the fall of Crete laid the way clear for a vastly increased Mycenaean activity.' And, we may be sure, for a vastly increased Egyptian maritime activity as well. Egypt, which is known to have traded heavily with Crete under the Minoans, must have found itself without choice expanded maritime activity on her own account or a severe starvation of imported goods. There may even be a possibility that the name Minyas (and, hence Minyae for the Argonauts) may have some connection with Minos (which gave us the word Minoan). After all the Minoans were in considerable contact with the Egyptians and were the best sailors of their day.

It has been worth while to go into all this about the Minoan collapse at about the time of the upper limit dates which we have arrived at in other ways. For with the disappearance of Minoan supremacy at sea, vast numbers of other people were free to ply the sea lanes and no doubt did so, bringing a proliferation of variegated contacts between cultures which the uniform Minoan sea traffic had ironed flat and featureless. Enterprising folk from almost anywhere — ethnics from mainland Greece, sophisticates from riverine Egypt, and clever Semites from Lebanon, Canaan, Palestine, all with their eyes on the main chance, could find something that would float and have a go.

All these folk suddenly let loose on the high seas brought an inevitable cross-fertilization at the cultural level, even if piracy must have increased alarmingly. There must have been a lot more drowned sailors and shipwrecked merchants, but an amazing amount of syncretism, during which our Sirius material

## THE HOUNDS OF HELL

must have leaked out into wider currency beyond the confines of Egypt and Sumer. Two millennia earlier, or even before that, the Egyptian and Sumerian cultures had shared many secrets – now these secrets were let out of Pandora's box and entered what was to become the Greek culture through synthesis in the white heat of warlike Mycenaean exploits at Troy and elsewhere. The Heroic Age was beginning – arete (the classical Greek ideal of excellence in all things) was to be forged by blood and iron in the lost Thebaid and the surviving Iliad, with the subsidiary sources of the great Odyssey and what remains of the Argonauts. Deeply imbedded like subtle dragon's teeth sunk in tough battle flesh, the bony outline of our Sirius material was to peer through the membrane of Greek epic tradition, to spring forth now in our century as the armed men of controversy. They have re-entered the field, we must face them. Rather than enter into combat, let us question these strangers about their origins. We are faced with the living fossils of a world almost entirely beyond our modern comprehension. These creatures are shaggy with the cobwebs of the centuries that preceded even classical Greece, and came before even Hesiod and Homer. These ghosts are antique in a sense which we rarely encounter except inside the tombs of Egypt or the burials at Ur.

To continue with elucidations of the Argonaut complex, we turn now to that invaluable compendium of all that is strange and wonderful about the world of the Greeks, Robert Graves's superb work *The Greek Myths*. There we find 7 'Aeaea ("wailing") is a typical death island where the familiar Death-goddess sings as she spins. The Argonautic legend places it at the head of the Adriatic Gulf – it may well be Lussin near Pola. Circe means "falcon", and she had a cemetery in Colchis, planted with willows, sacred to Hecate.' 5 In the *Argonautica*, we recall Jason offers a sacrifice to the goddess Hecate at Colchis at the suggestion of Medea. We shall see later that Hecate is a degenerate form of Sothis, or Sirius. But let us examine the above information from Graves. First we note that Circe, who figures so prominently in the *Argonautica*, has the meaning of 'falcon'. This brings to mind the prominent Egyptian symbolic 'falcon of Horus', which was the symbol of rising from the dead, or resurrection. The hawk or falcon of Horus presided over the Egyptian necropolis at Memphis, so it is quite obvious that it could have presided over the Egyptian necropolis at Colchis.

Naturally, the Greeks would have thought of the falcon in terms of their death-goddess Hecate.\* There was no reason for them to preserve the masculine gender of a Horus of whom they knew nothing. But the falcon of Horus could have had a powerful effect on them as a symbol and have been transferred to a feminine figure of Greek myth. In fact, this cemetery of Circe in Colchis is almost undoubtedly an Egyptian cemetery surviving from Herodotus's Egyptian Colchians, and presided over by the falcon of Horus which in Greek was called Circe, and eventually became a female figure. The springing

\* Hesiod's account of Hecate shows her to have been the original Triple-goddess, supreme in Heaven, on earth, and in Tartarus, but the Hellenes emphasized her destructive powers at the expense of her creative ones. Lion, dog, and horse (were) her heads. the dog being the Dog-star Sirius'. Robert Graves, *The Greek Myths*, 31-7. Hesiod says (*Theogony* 416): 'In starry Heaven she has her place, and the immortal gods greatly respect her'.

.10

## THE SIRIUS MYSTERY

Up from the earth of the magically sown soldiers in the Argonautica must partially refer to the Egyptian soldiers buried in 'the cemetery of Circe' who were meant to rise from the dead under the auspices of the Egyptian god of resurrection, Horus, whose symbol was the falcon, or 'circe'. (Excavations could unearth the Colchian necropolis some day.)

Circe lived on the island of Aea, which has the same name as the city which Jason visited in Colchis and from where Medea came. In Greek mythology, Circe is the daughter of Helios and Perse and the sister of King Aeetes, the king of Colchis. She is therefore Medea's aunt (Medea eloped with Jason). As for the 'island' of Aea, I believe it was a holm, or river-island, in the Phasis River near the city Aea.

Circe's father Helios is the sun, who rose every morning from his magnificent palace near Colchis where he slept and stabled his horses overnight. And likewise the father of the Egyptian Horus was the sun, and Horus himself represents the rising sun. The Greek word *κύρκη* (kirke latinized as circe) revealingly means

'an unknown bird', if we consult (as we shall do from now on) Liddell and Scott's definitive Greek lexicon. In the form *κύρκος* (kirkos) the meaning is 'a kind of

hawk or falcon', 'a kind of wolf', 'a circle' (which in Latin became circus) or 'ring' and an unknown stone'. *Κίρκαια* (kirkaiā) means 'an uncertain plant'.

Of these only the proper noun *Κίρκη* (Kirke) has the specific meaning of Circe the Enchantress, although the same word in general is 'an unknown bird'. How appropriate a reaction for the Greeks to the falcon of Horus—a bird symbol unknown to them. But in trying to be more precise they make *κύρκος* (kirkos) 'a kind of hawk or falcon', as that is obviously what it is from its appearance though its especial symbolic value makes the Greeks doubt precisely

what the Egyptians intended. It looked like a kind of hawk or falcon but the Greeks weren't prepared to insist on exactly what species because it was an Egyptian, not a Greek, idea.

On a point such as this we must take advice' as from a lawyer. It is not sufficient merely to cite Liddell and Scott's lexicon. For this subject we turn to D'Arcy Thompson's definitive source-book *A Glossary of Greek Birds*\*. Under the entry there for *kirkos* we read: 'A poetic and mystical name for a Hawk, the sacred Hawk of Apollo, in the main an astronomical, perhaps solar, emblem

In Homer, the bird of Apollo. Od. xv. 525. The bird is not identifiable as a separate species, and is so recognized by Scaliger and others. Neither the brief note as to its size in a corrupt passage of the ninth book of the *History of Animals*, nor the mystical references to its alleged hostilities and attributes in Aristotle, Aelian, and Philo, are sufficient to prove that the name indicated at any time a certain particular species. The word is poetical. The chief allu-

sions to ~~hierax~~ are obviously mystical, though the underlying symbolism is not decipherable.

Under another entry, for *Hierax*, Thompson gives some further interesting information. The word *hierax* is a generic term for all hawks. It too seems to partake of overtones of Horus, as Thompson specifically notes when he refers to the 'Worship of Hawks in Egypt', citing Herodotus and Aelian, and says: 'In the Rig Veda the sun is frequently compared to a hawk, hovering in the air. Their heart is eaten, to obtain prophetic powers, Porph. *De Abst.* ii. 48-9. The Hawk entered in Egypt into innumerable hieroglyphics.

## THE HOUNDS OF HELL

### III

(as) Horus and Hat Hor, the latter being the ~~hierax~~ of Plutarch. According

to Chaeremon, fr. 8 ~~ἱεραξ-ἱεραξ = ἱεραξ~~. On the sanctity of hawks in Egypt,

and the solar symbolism associated with them there, see also 'etc.' referring to Porphyry, Plutarch, Eusebius and Clement of Alexandria. The scholarly reader who wishes to pursue all this must go to Thompson directly.

*Kirkos* also means 'an unknown stone'. Here again we come upon the stone motif which we encounter with Deukalion (the Greek Noah) and elsewhere. The stones of Deukalion spring up as men—men born from the earth just as the dead of the Colchian cemetery are meant to be born again from the earth.

A further connection of Circe with the Sirius complex lies in the fact<sup>10</sup> that the island of Circe was the place where Orion met his death. Orion as a constellation was identified (as *Sah*) with Osiris, the husband of Isis, who was

identified, of course, with Sirius

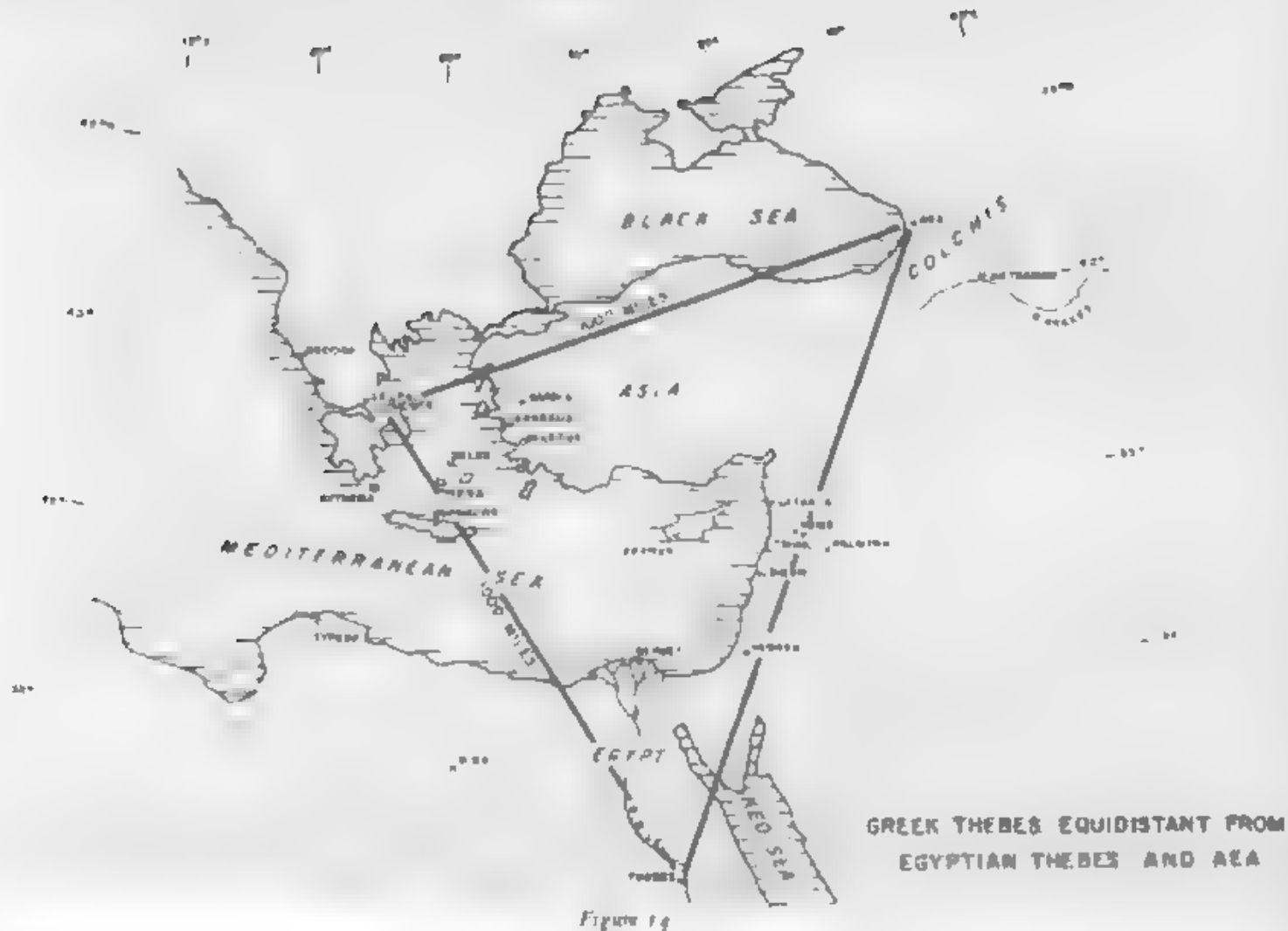
The stone motif in its recurring forms seems to have had a particular connection with the Minyae, as I discovered from that invaluable duffle-bag of information, the ancient Greek author Pausanias, whose Guide to Greece is a real 'experience'. The Minyan city was traditionally that of Orchomenos in Boeotia, and it will be recalled that all the Argonauts were Minyae and descended from Minyas, King of Orchomenos.

All my references to Pausanias will be to Peter Levi's excellent translation published in two volumes by Penguin in 1971 with extensive notes and comments by that learned Jesuit translator, who has travelled over most of the terrain described by Pausanias and attempts a running commentary on the present state of the ruins and sights (and sites).

In Book IX, 34, 5 we read 'Over from Mount Laphystion is Orchomenos, as famous and glorious as any city in Greece.' Levi's footnotes tell us 'No one knows which mountain this was - probably the one above Hagios Georgios and the modern Laphystion - and (Orchomenos is) at the north-west corner of the old Kopais Lake.'

At Orchomenos 'there are graves of Minyas and of Hesiod (38, 3). At Mount Laphystion near by was (34, 4) 'the sacred enclosure of Laphystian Zeus. The statue is stone. They say Athamas was about to slaughter Phrixos and Helle here when Zeus sent the children a ram with a golden fleece and they ran away on the ram.

Now note what Pausanias says (38, 1) about the Minyae of Orchomenos 'Orchomenos has a sanctuary of Dionysos, but the most ancient one is consecrated to the Graces. They pay particular worship to rocks, saying they fell out of heaven for Eteokles: finely-made statues were dedicated in my time but even these were in stone.' Levi adds 'The ruins of these sanctuaries are on the site of the old monastery (now itself in ruins). Now, I believe this singular observation on the Minyae's preoccupation with stones ties in with all the recurring stone motifs in our material. And now we shall see a further recurrence which ties back in another way (38, 4) 'The Orchomenians had a legend about Aktaion. An apparition with rocks in its hand was devastating the countryside: when Delphi was consulted the god ordered them to find anything that was left of Aktaion and cover it with earth, and then make a bronze image of the ghost and rivet it with iron to a rock. I have seen this



## THE HOUNDS OF HELL

1.3

riveted statue; once a year they burn offerings to Aktaion as a divine hero  
[the italics are mine]

The public furore in 1973 over the painting by Titian, *The Death of Actaeon*, will have reminded British art lovers of the background to the myth which the famous painting portrays. Actaeon happened to see the goddess Artemis (known to the Romans by her Latin name of Diana) of the silver bow bathing

naked Artemis then hunted him down, with fifty hounds, transformed him into a stag and killed him with her bow (not only are hounds connected with the Dog Star, but the bow is a familiar symbol connected also with Sirius, which was so often known in ancient times also as the Bow Star) \* Not only were the hounds of Hades who chased Actaeon fifty in number, but Robert Graves tells us 'Actaeon was, it seems, a sacred king of the pre-Hellenic stag cult, torn to pieces at the end of his reign of fifty months, namely half a Great Year' \*\* Note the application of the number 'fifty' here to a period of time. The orbit of Sirius B around Sirius A is fifty years: the reign of a sacred stag king was fifty months. We know how often in ancient traditions the numerical quantity of time periods remains stable while their quality (as individual durations) varies. The classic examples are in the Bible, where the seven days of creation refer to seven aeons, and the 'years' of life of the Hebrew patriarchs such as Methusaleh are not correctly interpreted as solar years but as lunar months or lunar years: a month long (since by late times the area of the Near East which had by then produced the people known as Hebrews had succumbed to a lunar calendrical craze: literally moonstruck and everything was a lunar rather than a solar period of time to those people in that area).

Note further the reference to a 'Great Year' of twice fifty months, consisting of two reigns. This would be one hundred months. And it should not surprise us to learn now that the name of the Greek goddess Hecate literally means in Greek 'one hundred' \*\*

Perhaps something of the true meaning of the myths is now becoming evident. The ancient peoples were not concealing information from us out of spite. Their purpose in disguising their secrets was to see that those secrets could survive. In fact, so successful were the ancient Egyptians in accomplishing their purpose, that the Greeks often preserve earlier Egyptian secrets in total ignorance of their true meaning, retaining only through an innate conservatism certain peculiar archaic details which we now find to be so important. Not only are the stories mythical and symbolical, in that they are not meant to be taken at face value, but they even involve 'characters' and 'events' which have a strictly numerical significance. But this should have been quite obvious to the reader since we began to study the Anunnaki. It is, admittedly, difficult for those of us who have been brought up in our strictly literal civilization, where there is no such thing as a hidden meaning and everything

\* This scene is portrayed in Plate 17, which shows an ancient Greek vase painting from approximately 470 B.C. of Artemis and the hounds slaying Actaeon.

\*\* The Dogon tribe often describe the 50-year orbital period of Sirius B by saying, 'The period of the orbit is counted double, that is, one hundred years, because (of) the principle of twinning' (see Chapter 1). Here we have the same custom in operation among the Greeks, of 'twinning' their sacred durations for  $50 \times 2 = 100$ . Hecate ('one hundred') unites them.



is on the surface, to think in such a way as to understand the ancient myths. It was, after all, only a century ago that supposedly intelligent people were maintaining that the Earth was created in 4004 B.C., on the basis of what the Bible was reputed to have said! And it is only half a century ago that the courts of Tennessee in the famous Scopes trial decided that the theory of evolution was not only unholy but illegal and could not be taught in the schools. We mistakenly assume that because we have superlative technology and science we must also be extremely civilized and come from a subtle background of sophisticated thinkers. But this is all a base illusion.

In fact, we are on a low rung of the ladder of evolutionary intelligence and in many ways (such as ethics and aspirations to excellence) we have gone backward since those early mutants in our paltry intellectual history on this planet, Confucius, Socrates, the Buddha, and the others of whom every reader may substitute his own favourites.

But this book is not meant to be a sermon on the evils of a vacuous civilization. We are meant to be examining the names of some of the principal characters of the Argonautica, and it is best that we pretend to ourselves that we are rational creatures and supremely moral, and turn back to the subject again.

The name Jason means 'appeaser' which is in accordance with his vacillating character (see Rieu's introduction to his Penguin translation of the Argonautica for some caustic comments on Jason.)<sup>12</sup> 'Medea' means 'cunning', 'Aeetes' means 'mighty' or 'eagle', and he was Medea's father, the King of Colchis from whom Jason stole the fleece.

Now we have seen that Actaeon was associated with Melanorchomenos, with a rock-throwing ghost (echoes of Deukalion), with fifty hounds of Hades, and with a reign of fifty months. The connections go even further. From Pausanias (34, 4) we learn that on Mount Laphystion is the place described thus: 'Higher up (from the spot where the ram with the golden fleece leapt into the air and took off) is Fire-eyed Hercules where the Boeotians say Hercules came up with the dog of Hades.' Now, this 'dog of Hades' is Cerberus, who originally had fifty heads! (Later the simplification of three heads, as for Hecate who was also of Hades, was adopted for Cerberus, when fifty must have seemed to make no sense and was probably too difficult to paint on vases. But of course three is significant too. The Egyptians portrayed three goddesses in the Sothis-boat Sothis, Anukis, and Satis.)

Graves informs us<sup>13</sup> that, Cerberus was, at first, fifty-headed, like the spectral pack that destroyed Actaeon (see 22.1), but afterwards three-headed, like his mistress Hecate (see 134.1). (The three-headed Hecate is the three Sothis-goddesses blended in one and is an underworld counterpart, just as with the Sumerian Anunnaki of the underworld.)

What of the fleece itself? There are obvious connections of the golden fleece

and Colchis with the common golden yellow dye which comes from saffron (crocus sativus). The crocus with its saffron is even today confused with meadow saffron' (colchicum) which takes its name, obviously, from Colchis, which was its chief area of production. The colchicum plant which somewhat resembles the crocus in its flowering stage was terribly important to the ancient world. It was the only known medicine against the disease of goat (and indeed still is). It is known to have been used to treat gout in ancient Egypt and all over the

## THE HOUNDS OF HELL

115

Ancient Mediterranean. As Colchis was the place to find colchicum that may explain why the Egyptians first settled there.'

It is probable that the crocus and ordinary saffron was present in Colchis in abundance, along with the false or meadow saffron, colchicum, and that the two became as confused with each other in ancient times as they are today. Indeed, it is only modern botany which proc.ains a difference between the two to the extent that we no longer confuse them officially. As real saffron produced a much valued dye, it is not surprising that a golden fleece dyed golden yellow by saffron dye would be said to exist in Colchis'. And indeed, Medea's famous herbal knowledge was well suited to Colchis, which produced the only cure for one of antiquity's most dreaded diseases, a disease which causes terrific pain and discomfort and could only be relieved by the magic herb from the mysterious distant land of Colchis. I Burkil<sup>14</sup> gives interesting information on the early history of saffron. He says that sun worshippers speaking an Aryan language spread to India from Turkey and made the saffron crocus an object of veneration and found ways of using its colour.<sup>15</sup> This information given by Tackholm and Drar,<sup>16</sup> offers a great deal of support to my contention.

Richard Allen<sup>17</sup> discusses Aries (the ram) and says that Miss Clerke says that the (Egyptian stellar ram's) stars were called the Fleece. He adds that the god Zeus-Ammon (Ammon)-Jupiter assumed the Ram's form when all the inhabitants of Olympus fled into Egypt from the giants led by Typhon. And in this discussion of Aries, Allen mentions 'some of its titles at a different date being applied to Capella of Auriga'. This is the sort of process we shall encounter again and again - titles and descriptions of stars being applied to neighbouring or similar stars as the original traditions become confused. It is particularly evident in the application of the description of 'heavy' or 'weight' to different stars associated somehow with Sirius, as the original object to which this description was meant to apply, Sirius B, was not visible and so tradition, being conservative, kept the description and applied it to other stars related to Sirius which could actually be seen. As with numerical traditions like that of 'fifty', when the true significance was forgotten the symbol or concept was merely given a new unpromptu explanation.

Aries was definitely identified with the golden fleece. Allen gives much information regarding this.

It always was Aries with the Romans but Ovid called it phrixæa ovis and

Columella pecus athamantis helles, phrixus, and portitor phrixus, others phrixum pecus and phrixus vector Phrixus being the hero-son of Athamas, who fled on the back of this Ram with his sister Helle to Colchis. On reaching his journey's end, Phrixus sacrificed the creature and hung its fleece in the Grove of Ares, where it was turned to gold and became the object of the Argonauts' quest. From this came others of Aries' titles: ovis aurea and auratus, chrysomalus and the Low Latin Chrysovellus.

As the fleece was a solar symbol, it is just as well that we look at the concept of Horus once again. Horus in Egyptian is Heru. And from Wallis Budge we learn that Heru is 'the ancient name of the Sun-god' 18. The word heru also has the meaning of 'face' 18. But let us consider the following: Heru (Horus) and his hawk/falcon presided over the Colchian cemetery and gave the name to Circe

.16

## THE SIRIUS MYSTERY

(which means 'hawk/falcon') who was Medea's aunt. The Greek sun-god Helios was said to stable his horses at Colchis and have a magnificent palace there from which he arose every morning. Also Colchis was the place of residence of the solar golden fleece.

Now, we recall that in Egyptian the letter 'L' and the letter 'R' are entirely interchangeable and have the same hieroglyph. Consequently, Heru could just as reliably be Heu. If one takes Helu and puts a Greek ending on it one gets Helios! And the same word means the sun-god in both the Egyptian religion (early) and the Greek religion (early). In both lands the name was eventually superseded, in Greece by Apollo, for instance. So here we have a further connection between the Greek tradition as centring round Colchis and the Egyptian tradition as settled there, only this time the evidence is linguistic.

It seems that the curious Greek word hero comes also from heru, though a word similar to hero exists in Sanskrit, the language of ancient India after c. 200 B.C. The word in Sanskrit which has the meaning of 'hero' is the related Vira. It is used in the precise sense of 'hero (as opposed to a god)' in the early Rig veda and is thus attested at the time of the first migrations of Aryans into India. There is no question that the two words are cognates of each other. However, I propose for them (and we shall see more examples of this later in the book) a common derivation: from the Egyptian heru.

The word heru is given a meaning by Wallis Budge<sup>20</sup> almost identical with that of hero and vira and is described as follows: 'applied to the king as the representative of the sun-god on earth. This is a precise meaning applying to a human being on earth who is neither god nor daemon, but hero'. Liddel and Scott make clear that the word was not used solely for those warriors who were prominent in battle, but was used to describe the minstrel Demodocus, the herald Mulus, and even (in the Odyssey 7, 44) 'the unwarlike Phaeacian people

are so called' In Homer 'the heroes were exalted above the race of common men' but particularly in Pindar the poet, we find the word used to describe a race 'between gods and men', in precisely the sense that we should expect the word heru to survive in another language. This Egyptian application of the word to their Pharaohs survived almost without change in Greek and Sanskrit and later in Latin and the later Indo-European languages.

It is interesting to note in the account of the word Helios as given by Liddell and Scott, Homer used the term in reference to 'the rising and setting, light and darkness, morning and evening'. In Egypt the precise application of Horus as sun-god was in his activity as rising and setting. He was the child who was born afresh each morning (and to the Greeks Helios was born afresh every morning at Colchis). Homer has thus used the fora-derived Helios in precisely the manner which we might have expected of an Egyptian, rather than a Greek, poet.

In Liddell and Scott we find the listing immediately after Helios of Helio-Serapis, which is an Egyptian divinity. I leave the reader to draw his own conclusions regarding this clear use of the word Helio to preface a description of Serapis. Serapis was the Greek form of Asar-Hep, Hep being what is known in Greek as Apis the Bull. Asar is, of course, Osiris. In Egyptian it was quite common for there to be references to Horus-Osiris combining Heru and Asar. Here in Greek we find this, if we accept my thesis of the derivation of Helio from helu or heru.

## THE HOUNDS OF HELL

.17

The reader is by now presumably immune to shock at the endless 'surprises' which arise in the course of this enquiry. Hence he will no doubt be prepared to learn that if we shorten the 'E' (from eta to epsilon) in Greek, we have the fora-derived word (which has dropped the aspirate, probably in connection with the shortening of the vowel) erion, which means 'woollen fleece'.

There is a possibility that Herakles ('the glory of Hera'), the original captain of the Argo according to Graves, and his protectress the goddess Hera (wife to Zeus and Queen of the gods) are derived from heru and they are known to be related to the word Seirios which gave us Sirius and the Sanskrit svar suryas etc. In Sanskrit Sura means 'hero', indicating that these words may relate also. Liddell and Scott believe this complex of words to be separate from the Helios-complex, but their opinion is only an opinion. Surana means 'fiery', just as Seirios can in the sense of 'scorching' (due to the supposed 'scorching' of the Dog Star, etc.).

Back to our fleece. We find that the Greek word for a woollen fleece is related to the Egyptian word for Horus, the Greek word for sun, etc. etc. So much for the puzzling nature of that now moot question: 'Why a fleece?'

Back to sacred puns again, which besiege us endlessly.

Let us not forget the Sumerians. Let us look again at that list of the fifty names of Marduk. One of them is the name Nebiru. It is commonly taken to be the name of the planet Jupiter, but there is confusion there, and the word is discussed in Hamlet's Mill and many other places as one of the infuriating Sumerian words which we would like to understand. Where did it come from? What does it mean? Why is it one of the fifty names?

Immediately after this forty-ninth name, Marduk is called Lord of the Lands (its Akkadian form, which has no significance for us, is Bel Matani. I do not know the Sumerian form, which might be of interest to us). Then, after this supposed fiftieth name comes another name, namely, Ea (Enki). Then Marduk is described as being of fifty names. It seems not to make perfect sense, since he has just been given fifty-one names. One way in which to make it sensible is to treat 'Lord of the Lands' (which is given in English in Speiser and Heidel, unlike all the other names) as a synonym of Nebiru. If we do this, then Ea is the fiftieth name and everything is all right.

Now, let us look at the Egyptian language once again. We find that the word Neb is extremely common and is used in many combinations and means 'Lord'. Without further ado, let me make clear that I believe the Sumerian Nebiru to be derived from the Egyptian Neb-Heru. If we treat Heru in its older Egyptian sense as the sun, then the descriptions of Nebiru in the Babylonian Enuma elish could read as a perfect description of Neb-Heru: the Lord the sun. 'Nebiru shall hold the crossings of heaven and earth. He who the midst of the Sea restlessly crosses, / Let "Crossing" be his name, who controls its midst, etc., though overlaid with this, as with the traditional Horus, is a strictly stellar element which is behind the more obvious solar element. However, I do not wish unduly to confuse the issue by peeling off too many layers at once. Suffice it to recall the previously mentioned associations of Horus with the Sirius system and note that there is a Heru-ami-Sept: 'Horus of Sothis' and Heru-Sept, 'Horus the Dog Star' and then to note, again in association with Nebiru, which is supposed to have been Jupiter, that there is in

Egyptian a Heru-sba-res 'Horus, star of the south, i.e. Jupiter' and Heru-up-Shet, 'the planet Jupiter', also in the Enuma elish Nebiru is clearly described as 'a star'. Horus also exists as Heru-ami-u which is 'a hawk-headed crocodile with a tail terminating in a dog's head'. The dog is related to Sirius. Heru-ur-shefit is a jackal form of Horus, heru is also the name of a sceptre and of a jackal-headed standard in the other world. A form of Horus using the common word Neb is Heru Neb-urr-t, meaning 'Horus as possessor of the supreme crown'. Another of several is Heru Neb-pat, meaning 'Horus, lord of men'. Heru Neb-tani is 'Horus, Lord of the Two Lands'. Recall our synonym for Nebiru: 'Lord of the Lands'.

We are getting deeper and deeper into the legend of the golden fleece, of origins of Greek and Middle Eastern ideas in Egypt, along with key words and names, etc. All these centre round the curious Sirius complex. What more will we uncover? Perhaps we need a break from all these Egyptian words. There are many other aspects of our subject, and it leads us ever closer to the solution of our mystery – which is the origin of the subject.

## Notes

1. Toward the Image of Tammuz and Other Essays, Harvard, 1970
2. Kramer, S. N. History Begins at Sumer. Doubleday Anchor Book, New York, 1959, pp. 91-4
3. Antiquity of the Jews, Book I, Chapter 2
4. Herodotus, trans. A. de Selincourt, Book 2, 103
5. In Pritchard, Ancient Near Eastern Texts, p. 8
6. 'The Rise of Mycenaean Civilization', Cambridge Ancient History
7. Graves, Robert. The Greek Myths, 2 vols., Penguin Books, London, 1969, 170-5
8. Thompson, D'Arcy Wentworth. A Glossary of Greek Birds, Oxford, 1896
9. Porphyry, On Abstinence from Animal Food, for those who are not familiar with the traditional abbreviations. Porphyry was an early Neoplatonist, a student of Plotinus, who transcribed the Enneads. Thomas Taylor translated much of what survives of Porphyry's own writings, including On Abstinence, in Select Works of Porphyry. London, 1823
10. Graves, op. cit., 170-6
11. Ibid. 22.
12. Robert Graves takes the view that Jason means 'healer'
13. Graves, op. cit., 31-3
14. The reference is to I. Burkill (1935) but I have not been able to trace the publication concerned and have gone to immense pains over it. Burkill was a noted botanist. A botanical publication of his for 1936 is not the correct reference. See Note 15 for source.
15. Tackholm and Drar, 'Flora of Egypt', Vol. III, Bulletin of the Faculty of Science, No. 30, Cairo University Faculty of Science, Cairo University Press, 1954
16. See Note 15

- .7 Star Names, op cit See entry under Aries
- .8 Wallis Budge, Hieroglyphic Vocabulary to the Theban Recension of the Book of the Dead, London.
- .911 See entry for Her p 273
- .9 Ibid., p. 271
- 20 Ibid p 273, entry for Her

## SUMMARY

The Sumerian god An had a daughter, Bau (representing the sound of a dog barking, as does the ancient Egyptian word for 'dog', anaw), who was a dog-headed goddess. The Egyptian god Anubis (Anpu) was a dog-headed god.

## THE HOUNDS OF HELL

1.9

The Sumerian Bau, as a daughter of An, is a sister of the fifty great gods (Anunnaki) who are also children of An. Since Bau may be a goddess of the Dog Star Sirius, the fact that she is the sister of the fifty is significant, as Sirius B has an orbital period of fifty years.

The golden fleece was situated at Colchis in the Black Sea, where Jason and his Argonauts went to seek it. Colchis was an ancient Egyptian colony before 1200 B.C.

Herodotus emphasizes that the Egyptians originated the practice of circumcision, which survived also among the Colchians, whom he visited (the Hebrews acquired circumcision from the Egyptians while in bondage). It is noteworthy that the Dogon ceremony of the Sigui, which is connected with the Dogon Sirius-mysteries, centres largely round rites of circumcision.

Prominent in the story of the Argo is the female character Circe (whose name means 'falcon' or 'hawk'). Horus, son of Isis and Osiris, was symbolized by a falcon or hawk. Circe presided over the Colchian cemetery (which was originally Egyptian, Colchis having been an Egyptian colony). Horus, who presided over the cemetery of Memphis in Egypt, would have presided also over the one at Colchis while Egyptian influence was still directly exercised. Circe is obviously a Greek derivation of Horus.

The word kirke (Circe) in Greek, which we customarily write 'Circe' due to our habit of changing Greek k's into Latin c's, specifically means 'a kind of hawk or falcon' or 'an unknown bird'—just the sort of confusion we should expect among the Greeks with regard to a concept derived from Egyptian culture and imperfectly understood.

Actaeon, representing a sacred stag-king, was hunted down by fifty hounds (the dog motif joined to fifty) and killed with a silver bow (Sirius has also traditionally been known as 'the Bow Star', and in Egypt the goddess Sirius holds a bow).

The sacred king, such as Actaeon represented, had a sacred reign of fifty months. It is arguable that 'fifty months' is a shorthand version of fifty years, but we now see undeniable ancient traditions connecting Sirius with fifty intervals of time (whether months or years) comprising 'a reign'. And of course the orbital period of Sirius B is fifty years comprising 'an orbit', which in mythological parlance could quite easily be considered 'a reign'.

As is explained in Chapter Six, the fifty-month period later became applied to the Olympic Games when they were established. It defined the interval of time separating them, approximating four solar years. In fact, the Olympic Games were actually separated by alternating intervals of 49 months, then 50 months, then 49 months, etc. This suggests even further an attempt more closely to approximate the 49.5 years of Sirius B's orbit in 'month-code'. For by doubling up in this way, using the nearest two whole numbers in alternation, the exact correspondence was obtained, for  $49 + 50$  gives the same as  $49.5 + 49.5$ . Robert Graves has offered the only previous theory to explain the 'fifty months' in ancient Greece, but his lunar theory does not explain the alternation between 49 and 50, or other mysterious aspects. It is probable that the true explanation based on the Sirius mystery was later overlaid by a lunar tradition which was offered as an 'explanation' to non-initiates, despite its obvious flaws.

It was customary in ancient times also to group together two sacred reigns of fifty months each to form a 'Great Year' of one hundred months. (In practice, as with the Olympic Games, 99 months were actually used, but in theory one used the round figure of 100 months conceived of as 'two reigns'.) The name of the Greek goddess Hecate (Hecate) literally means 'one hundred'. She was involved with the Argo tale and specifically identified by Robert Graves with Isis, and in other ways linked to Sirius as an 'underworld version'.

The fifty hounds of hell who pursued Actaeon have a counterpart in Cerberus, the hound of hell who had fifty heads in the earlier tradition. These fifty heads were later discarded in the tradition, like Gilgamesh's original fifty companions, and Cerberus was said to have three heads. But originally he had fifty, as Hesiod describes him. This is thus

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.20

## THE SIRIUS MYSTERY

yet another dog motif connected with fifty (Sirius being the Dog Star), and linked to Sirius in various ways, such as through the goddess Hecate as an underworld version of Sirius. (The fifty Sumerian Anunnaki also had their counterparts in the underworld. Fifty in the underworld as 'death-counterparts' or shadows to fifty in heaven makes one hundred—the very meaning of Hecate.)

The only known cure for gout (a serious ancient Egyptian complaint) is a substance taken from the plant colchicum, named after Colchis where it grew. This may explain a colony at Colchis. Colchicum is also called meadow saffron and resembles true saffron.



(which also grows along the Black Sea coasts), which gives a golden dye, perhaps explaining the 'golden' fleece. A golden fleece is a solar symbol. Horus was a solar god. The letters L and R are interchangeable phonetic liquids. The Egyptian form of Horus, Heru, can become Helu and give us the Greek solar god's name Helios. Helios was supposed to stable his horses at Colchus. The Greek word for 'woollen fleece' is erion, a word similar to Heru with a dropped aspirate ('h').

## CHAPTER FIVE

### The Oracle Centres

A consideration of the ancient oracle centres will now be useful in our quest. These centres in the Middle East seem at a casual glance to be dotted around apparently at random. However, there is actually a pattern in their distribution which we will find bears some relation to our subject, and which indicates a highly advanced science of geography and related disciplines in the ancient world. Examination of the oracle centres will be seen to have a connection with the ship Argo and will help us to fill in some of the missing background to the entire system of the ancient religious mysteries. The oracle centres were the main places where religion was practised in the ancient world. It makes sense that their occurrence would not be the product of pure chance and certainly not of convenience. What place could be more out of the way than Dodona in Greece? It was geographically outside the sphere of the civilized world of the Greeks—somewhat more north and more west than any Greek could call comfortable. Why was such an important and senior place of worship in the wilds? Indeed, for that matter, why did Noah's ark land on a mountain nobody ever visits and which is far more remote than even Dodona? The ark and Argo and their connections with the Sirius mystery will now be seen to have an intimate connection with the entire geographical structure of the practice of religion in the ancient Mediterranean world. It is important that we explore these extraordinary ramifications fully.

Now we are about to consider a most difficult and complex web of ancient practice which it seems to be possible for us to decipher. Let us approach it in a simpler way than that by which I was originally led to it. Let us look at the ship Argo as if it were spread over the surface of the globe by projection. This may seem a curious idea, but the reader must bear with me. After all, the boat is celestial, so why not a projection on the earth's surface from above? Most prominent in the constellation is the star Canopus which was called 'the Rudder'—pedalion, by Aratos, Eudoxus, and Hipparchos (the leading Greek astronomical figures before Ptolemy), as we are informed by Allen.<sup>1</sup>

There was a place named Canopus on the northern coast of Egypt, which was quite a famous city to the Greeks, and Allen describes it thus: 'Ancient Canopus is now in ruins, but its site is occupied by the village of Al Bekur, or Aboukir—famous from Lord Nelson's Battle of the Nile, 1 August 1798, and from Napoleon's victory over the Turks a year afterwards—and it is interesting to remember that it was here, from the terraced walls of the Serapeum, the temple of Serapis, that Ptolemy made his observations. In his book Hellenistic



Figure 15 The above geodetic pattern (left), seems to match a stellar pattern of Argo (right)

Civilization, W. W. Tarn comments on Canopus after Alexander the Great had founded Alexandria near it, that from Alexandria 'the gardens of the wealthy extended to Canopus, Alexandria's playground'. To the Greeks, Canopus was the most famous Egyptian city on the northern coast before the foundation of Alexandria. In earlier times the fame of Canopus was held by a city called Behdet, which was a pre-dynastic capital of Egypt before the unification of

Egypt and the transferring of the capital to Memphis further south. So, just as Canopus became superseded by Alexandria, Canopus had itself superseded the extremely ancient Behdet which existed before 3200 B.C. as the most important city on the Egyptian coast. In our discussion which follows we must realize that in the times just preceding and during the classical period in Greece the fame that had once attached to Behdet had shifted to Canopus, along with many traditions which were in actuality native to Behdet, which was by then a neglected place which no Greek knew.\*

Richard Allen says further of the city of Canopus. 'Our name for it is that of the chief pilot of the fleet of Menelaos, who, on his return from the destruction of Troy, 1183 B.C., touched at Egypt, where, twelve miles to the north-eastward from Alexandria, Canopus died and was honoured, according to Scylax, by a monument raised by his grateful master giving his name to the city and to this splendid star which at that time rose about 7.5 deg. above that horizon.' Sir Norman Lockyer in *The Dawn of Astronomy* describes ancient Egyptian temples oriented to the rising of the star Canopus.<sup>2</sup>

Note in the above story of the pilot Canopus that the names of the city and the star are specifically said to have the same origin and that it is from a famous pilot of a fleet, the man at the helm who steers the rudder in the lead ship. Once again, in another way, the star (and the place) are identified with the rudder, which was the other name for the same star.

Allen brings forward another interesting aspect of the star's name, which will be something familiar to us.

The foregoing derivation of the word Canopus is an early and popular one, but another, perhaps as old, and more probable, being on the authority of Aristides, is from the Coptic, or Egyptian, Kahi Nub, Golden Earth Ideler, coinciding in this, claimed these words as also the source of other titles for Canopus, the Arabic Wazn, Weight, and Hadar, Ground, and of the occasional later Ponderosus and Terrestris. Although I find no reason assigned for the appropriateness of these names, it is easy to infer that they may come from the magnitude of the star and its nearness to the horizon, this last certainly made it the ~~Πηγεῖος~~ [Perigeios - near the earth] of

Eratosthenes

Notice how the irrepressible Al Wazn, 'Weight', and its Latin form Ponderosus, keep springing up whenever there seems to be a connection with Sirius.

\* Behdet is on the same latitude as Hebron in the present-day Israel-occupied west bank of Jordan. In Chapter Four of *The White Goddess*, Robert Graves tells of the Philistines, who captured the shrine of Hebron in southern Judaea from the Edomite clan of Caleb; but the Calebites ('Dog-men'), allies of the Israelite tribe of Judah, recovered it about two hundred years later. 'The Dog-men' are probably connected with Sirius the Dog Star and Hebron.

is the eastern counterpart of Behdet





Figure 16. Plan of ancient Egyptian geodetic scheme based on Helix

## THE ORACLE CENTRES

125

Allen mentions that 'The Hindus called (Canopus) Agastya, one of their Rishis, or inspired sages, and helmsman of their Argha' which is in striking agreement with the Mediterranean concepts

Further in line with our previous discoveries it will be interesting to note what Allen says of another of the stars of Argo, the star (eta) '(Jensen) claims it as one of the (Babylonian) temple stars associated with Ea, or Ia [Ea was his Akkadian name, Enki was his Sumerian name Eridu was his geodetic city, which was the southernmost of all the Sumerian cities. A whole book could easily be written on this subject, a good start for the interested reader would be Hamlet's Moon and also the relevant section in Expedition Tortoise - see Bibliography], of Eridhu, the Lord of the Waves, otherwise known as Oannes, the mysterious human fish and greatest god of the kingdom.

Here again we have our amphibious creature Oannes, identified now with the god Enki, who in Sumerian myth did indeed reside at the bottom of the Abzu, or Abyss, in fresh (not salt) water. It was, in fact, the god Enki who assisted man before the flood came by warning the proto-Noah of the Sumerian deluge story to build his ark. He thus fulfilled the function of the special presiding deity of the Hebrews, the Jehovah of the Old Testament. How many Jews know that their god was originally amphibious?

This early Noah or proto-Noah, whom the god Enki warned, was called either Ziusudra or Utnapishtim, depending on which period of pre-Biblical literature one consults. In the early deluge stories, the proto-Noah in his ark sends forth birds to seek dry land just as does Noah in his ark and rather as Jason sends forth birds to find the way through the clashing rocks. H. W. Parke in his book *The Oracles of Zeus* specifically associates the birds sent forth by Jason with Dodona. Both Dodona and Delphi claimed the 'Greek Noah' Deukalion as having landed his ark on the mountain tops at their locations. Noah himself landed his ark on Mount Ararat, which his bird found for him. We shall see in a little while the importance of these birds and the locations espied by them. But recall now the connections between Dodona and Mount Ararat implied by a common tale of their having both been found by a Noah in an ark who sent forth a bird who found the mountain. It is true that one tale is purely Greek and the other tale purely Hebrew. Naturally, there cannot be any real connection between Dodona and Mount Ararat. After all they are probably purely arbitrary locations. It is all myth and fable, isn't it? The Jews

and the Greeks were never in contact. There could have been no liaison between them. It is all separate hermetically sealed cultures with vague fairy tales and nonsense. Isn't it? Can anyone challenge such a view? Of course not.

So it is interesting that Dodona and Mount Ararat are on the same parallel and have the same latitude.

Furthermore, Mount Ararat has a centre associated with it which served much the same function to the Caucasians as Dodona did to the Greeks. It is called Metsamor. Here is a description of it by Professor David Lang and Dr Charles Burney.<sup>3</sup>

Archaeological research during the past half century has materially altered our concept of the history of literature, science, and learning in Transcaucasia. A key site here is the village of Metsamor, a few miles to the west of

.26

## THE SIRIUS MYSTERY

Echmiadzin, and within sight of Mount Ararat and Alagöz. Close to the village is a massive rocky hummock, perhaps half a mile in circumference, with outcrops of craggy stone. The hummock is riddled with caves, underground storage vaults, and prehistoric dwellings, and is now seen to have been a major scientific, astronomical and industrial centre, operating in the fields of metallurgy, astrology and primitive magic from a period hardly less than five thousand years ago.

The Metsamor 'observatory' is covered with mysterious, cabalistic signs. Indeed, hieroglyphic writing in Armenia goes back to very early times, perhaps to the New Stone Age. All over Armenia, we find pictograms or petroglyphs, carved or scratched on rocks, caves and cliff faces, and showing simplified human and animal figures. There is little doubt that these served as means of communication, as well as of ritual and artistic self-expression.

They also describe Metsamor's wide-ranging contacts with the outside world.<sup>4</sup>

Sumerian achievements as pioneers in copper and bronze metallurgy must not be underestimated. The early Transcaucasian cultural zone though geographically within the Near East, was divided only by the high but narrow Caucasus from the northern steppes and, once there, nothing could prevent the traders reaching the central European copper-working centres. Thus Georgia, with its neighbouring regions, was perhaps open as much to influences from Europe as to those from the Near East. Trans-

caucasia may have been not so much an original centre as a region into which metal working arrived from two different directions, and where, though present in earlier periods in a modest way it took root and from the late third millennium B.C. began to develop along distinctive lines, no longer owing its forms to external inspiration. Metsamor gives a hint that, just as earlier in Europe, once foreign merchants had arrived seeking sources of metals, bringing their copper and later their bronze products with them, and explaining, by choice or otherwise, their techniques to the local population, it was no time before a local industry began to arise. If present evidence indeed points to Armenia as the oldest centre of metallurgy in Transcaucasia, it points also to a Near Eastern inspiration.

It is extraordinary that if you place a compass point on Thebes in Egypt you can draw an arc through both Dodona and Metsamor.

We now return to Allen and his further remarks<sup>5</sup> about Oannes. Berossos described Oannes as the teacher of early man in all knowledge; and in mythology he was even the creator of man – and some have regarded him as the prototype of Noah.

Allen also describes the star Canopus in this way. And, as the constellation (of Argo) was associated on the Nile with the great god Osiris, so its great star became the Star of Osiris. He gives a further application of the title 'heavy'. The Alfonsine Tables had (for Canopus) Suhel Ponderosus ("Among the Persians Suhel is a synonym for wisdom" – and there was also, therefore, a "Suhel Sirius"), that appeared in a contemporary chronicle as Suhel Ponderosa, a

## THE ORACLE CENTRES

127

translation of A. Suhail al Wazn. Allen then gives several tales indicating that this designation was once applied to another star – formerly located near Orion's stars – and had to flee south, being an apparent admission that Canopus is being called by another star's title. Canopus is south of Sirius (which is 'near Orion's stars'), and so obviously the description of the invisible Sirius B 'fled south' to a likely visible star, Canopus.

Now to return to our projection of the Argo on the earth's surface. We put the stern of the ship and its rudder at the obvious place – Canopus. (But really slightly altered eastwards to the original city Behdet.)

Now we must consider Dodona. We are told that oak from Dodona was placed 'in the middle of the keel' of Argo by Athena. It obviously ran the whole length of the ship. It is also referred to as being in the prow, Allen says of this

Mythology insisted that (the Argo) was built by Glaucus, or by Argos, for Jason, leader of the fifty Argonauts, whose number equalled that of the oars of the ship, aided by Pallas Athene, who herself set in the prow a piece from the speaking oak of Dodona, the Argo being thus endowed

with the power of warning and guiding the chieftains who form its crew'  
 She carried the famous expedition from Iolchus in Thessaly to Aea in  
 Colchis, in search of the golden fleece, and when the voyage was over  
 Athene placed the boat in the sky

In measuring with the Argos projection one does so from the site of Behdet,  
 which is a bit east of Canopus on the northern Mediterranean coast of Egypt,  
 but it was common classical Greek practice to think of Canopus in place of the  
 forgotten Behdet, as for instance with 'the Canopic Hercules' who went to  
 Delphi and is mentioned by Pausanias as predecessor to the Greek Hercules  
 from Tiryns who was of much later date (It is important that the original  
 Hercules was admitted by the Greeks to have been an Egyptian ) In fact, the  
 Delphic oracle itself compares the Greek Hercules most unfavourably with the  
 original Egyptian one and remember it is said that in the earliest versions of  
 the story it was Hercules, not Jason, who led the Argonauts Also, it is well  
 accepted today among scholars that Hercules was in many ways a survival of  
 Gilgamesh, with particular motifs and deeds being identical in both heroes

Well, if we project the Argo on the earth with its rudder at Canopus (really  
 Behdet) we put the other end at Dodona because the oak in the prow came  
 from there Canopus Behdet is named after the rudder and Dodona produced  
 the prow Therefore we are not merely fantasizing when we project the image  
 of the Argo in such a way that the rudder is at the rudder on earth and the  
 prow is at the earthly source of the prow

If we then keep the rudder at the same spot and swing the boat over a  
 map so that the prow which touched Dodona points towards Metsamor, we  
 discover that the angle made is exactly a right angle of 90°

Now we get into geodetics, a fearsome subject The fact is that geodetics  
 involves a bit of bother It concerns latitudes and longitudes, and most people  
 would run a mile upon hearing those mentioned (sailors and pilots of aircraft  
 excepted) In fact no one is more likely to flee with terror from the subject  
 than an archaeologist There is almost nothing an archaeologist likes less than  
 being reminded how little he may know about the Earth as a body in space





## THE ORACLE CENTRES

129

and about astronomy. The average archaeologist is almost bound to be ignorant of even the most elementary astronomical facts. There are many caustic comments on this state of affairs to be found in *The Dawn of Astronomy*, written by the distinguished Victorian astronomer and friend of Sir Wallis Budge, Sir Norman Lockyer. And more recently some severe remarks have been made also by Santillana and von Dechend in *Hamlet's Mill*.

But we must come now to some extremely interesting further discoveries. Egypt is 7 deg. long in latitude from Behdet to the Great Cataract. I have

reasons for believing that the ancient Egyptians thought of distances of 70 as an octave, by analogy with music. Most readers will know that an octave contains eight notes on a scale over a space of seven intervals (five tones and two semitones actually, but let us think only of the seven intervals)

Just as this book was about to go to press, confirmation appeared in the newspapers that the ancient Mediterranean peoples did indeed know the principles of our musical octave. In the London Times<sup>1</sup> an article appeared describing the work of Dr Richard L. Crocker, Professor of Music History, and Dr Anne D. Kilmer, Professor of Assyriology and Dean of Humanities, both at the University of California, Berkeley. The article quoted Dr Crocker as saying: 'We always knew there was music in the earlier Assyro-Babylonian civilization. But until this, we did not know that it had the same heptatonic diatonic scale that is characteristic of contemporary Western music and Greek music of the first millennium B.C. After fifteen years of research, Crocker and Kilmer have demonstrated that some clay tablets from Ugarit on the coast of present-day Syria, dating from about 1800 B.C., bore a musical text based on our familiar octave. Dr Kilmer summed it up by saying: 'It is the oldest "sheet music" known to exist.' The two professors have even played the tune on a reconstruction of an ancient lyre in public, after an interval of only 3,700 years.'<sup>8</sup>

I believe that the Egyptians laid out a 'geodetic octave' commencing at 1 deg. north of Behdet (to emphasize its separateness from Egypt) and culminating at Dodona. For Dodona is precisely 8 deg. north of Behdet in latitude.<sup>1</sup> And the related oracle centre of Delphi is exactly 7 deg. in latitude north of Behdet.<sup>1</sup> (These last two facts were discovered by Livio Stecchini, as will be explained somewhat later.)

I have arrived at this sequence for a geodetic oracle octave (see Fig. 25 below):

8 Dodona

7 Delphi (with its famous omphalos, a stone navel)

6 Delos, the famous shrine of Apollo, once an oracle centre (also with an omphalos),

5 Kythera (Cythera), a site on the north-east coast (see later), or Thera

4 Omphalos (Thenae) near Knossos on Crete (on the Plain of Omphaleion),

3 Undiscovered site on Southern or South-western coast of Cyprus?

(Paphos?) (Cape Gata?)

2 Lake Triton (or Tritonis) in Libya

1 El Marj (Barce or Barca)

The ones which I have identified are spaced apart by one degree of latitude

from each other in sequence and are integral degrees of latitude from Behdet,

30

## THE SIRIUS MYSTERY

which we shall see was the geodetic centre of the ancient world (akin to Greenwich in the modern world) and was also a pre-dynastic capita. of Egypt

What justification have I for speaking of a link between the oracle centres and the musical octave? I have several reasons, and it would be just as well for me to give some slight indications here to make the reader who is justifiably puzzled at this point a little less so.

Graves<sup>9</sup> informs us of some interesting facts about Apollo, who was official patron god of Delphi and Delos (two of the centres on our list) 'In Classical times, music, poetry, philosophy, astronomy, mathematics, medicine, and science all came under Apollo's control. As the enemy of barbarism, he stood for moderation in all things, and the seven strings of his lute were connected with the seven vowels of the later Greek alphabet, given mystical significance and used for therapeutic music. Finally, because of his identification with the Child Horus, a solar concept, he was worshipped as the sun, whose Corinthian cult had been taken over by solar Zeus' (The italics are mine.) Note also the reference to Horus, whose falcon would have presided over the Colchian dead in their hope of resurrection. In fact, one meaning of kirkos (Circe = falcon'), which I did not elaborate on earlier, is 'ring'. I wish to comment in passing that not only was the ring traditionally a solar symbol (as was the golden fleece, and as was the falcon), but the Cyclopes who were one-eyed were really one-ring-eyed. Cyclopes means 'ring-eyed' in fact. Graves says 10 'One-eyed Polyphemus can be traced back to the Caucasus. Whatever the meaning of the Caucasian tale may have been, A. B. Cook in his Zeus (PP. 302-23) shows that the Cyclops's eye was a Greek solar emblem.'

The following remarks by Graves then tend to dissociate Cyclops from Cyclopes, but perhaps this should not be done, in the light of all these new insights. After all, the older Cyclopes were three, wild, and ring-eyed, and sons again of Gaia the Earth goddess just as were the three fifty-headed monsters (there is to be much discussion of this later). They would, according to my 'system', be solar too, and ring-falcon, earth-born of Gaia' and solar seem always to go together in the schema. Gaia, indeed, preceded the solar Apollo as presiding deity at Delphi. Not surprising, as Deukalion's ark landed on Mount Parnassus above Delphi (according to Delphic propaganda) and his 'mother' was Gaia, whose bones he threw behind him to people the desolated Earth once again.

It is not only Deukalion's ark that is connected with Delphi. There are

connections also with the Argo, as we learn from Godfrey Higgins 1. 'In the religious ceremonies at Delphi a boat of immense size was carried about in processions it was shaped like a lunar crescent, pointed alike at each end it was called an Omphalos or Umbilicus, or the ship Argo. Of this ship Argo I shall have very much to say hereafter My reader will please to recollect that the omphalos or ~~Delphos~~ (Delphys) is called by the name of the ship Argo.'

Other matters which Higgins connects with Delphi are the sacred syllable om of the Indo-Europeans which he says 'is not far from the divina vox of the Greek Hesychius, also Suidas in voce, interprets the word omph to be Oela ~~χρηδον~~ (thela chredon), the sacred voice, the holy sound - and hence arose the ~~ομφαλος~~ (omphalos), or place of Omphie ' He relates all this with sacred music and the traditional sacred name of God which consists of the seven vowels

## THE ORACLE CENTRES

13.

spoken in sequence to form one word, which is the 'not to-be-spoken word! He says As a pious Jew will not utter the word Ieue, so a pious Hindu will not utter the word Om.

Higgins says 'on phe, is the verb root in Greek of phao to speak or pronounce and phemi, 'to say' (I might add that ~~φηγος~~, phegos, is the word for oak, as at

Dodona, and ~~φημι~~ phemi, literally means 'oracle' ) Hence Omphie means 'the

speaking of Om ' (At the pheme Dodona the phegos literally practised omphe because the oak spoke there )

Delphi was said to be the omphalos, navel, of the world But it was in fact only one of many 12 The reader will have noticed that there is an Omphalos near Knossos in Crete which is one of the octave sequence of oracle centres laid out in geodetic integral degrees of latitude from Bendet, pre-dynastic capital of Egypt A photograph of the omphalos stone of Delos may be seen in Plate 12 as well The seven vowels, the seven strings of Apollo's lyre, the seven notes of the octave (the eighth being a repetition one octave higher of the first as most people will know), the eight oracle centres in the northern octave of oracles, the seven degrees of latitude marking the official length of ancient Egypt itself, the mystic and unspeakable name of God consisting of the seven vowels run together in one breath all these are part of a coherent complex of elements forming a system.

Before going much further, I should justify my tentative selection of a site on the island of Kythera (Cythera) which is off the southern coast of the Greek Peloponnese, as possibly being associated with the fifth in my series of geodetically sited oracle centres I found the necessary information while reading Professor Cyrus H. Gordon's remarkable book, The Common Background of Greek and Hebrew Civilizations 13 At the end of Chapter II, Gordon tells us the following

Sometimes cultic centres attracted people from remote areas. Probably the most common cause for such magnetism was an efficacious priesthood, that earned a reputation for helping people in need of practical advice, psychological guidance or medical aid. Cythera began to attract foreigners as early as the Pyramid Age. A stone cup, with the name of a Fifth Dynasty [the chronology of Richard A. Parker gives the dates 2501-2342 B.C. for the Fifth Dynasty] solar temple [of Pharaoh Userkaf at Abusir] (sp-rs) inscribed in Egyptian hieroglyphs, has been found on Cythera. Early in the second quarter of the second millennium, a Babylonian inscription of Naram-Sin, King of Eshnunna, was dedicated on Cythera 'for the life' of that Mesopotamian monarch. [This is one of the reasons for believing that both texts were sent to Cythera in antiquity. Modern deception is unlikely because the Naram-Sin text was found on Cythera in 1849 before the decipherment of cuneiform.] The interesting thing is that both of these texts found on Cythera are religious in character. Herodotus (1.105) relates that the Phoenicians erected a temple on Cythera to the goddess of the heavens. Finally in classical times, Cythera was a great centre of the cult of Aphrodite. The ancient temples were built in the vicinity of Paaiopolis around the middle of the eastern shore. I visited the site in 1958 and found it extensive and promising for excavation. Egyptians, Babylonians and Phoenicians came to worship the great goddess there. [At that time the

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. 32

## THE SIRIUS MYSTERY

### THE ORACLE CENTRES

. 33

great goddess, Gaia, was also in charge of Delphi before the usurpation by Apollo.] Ancient cultic installations, carved out of the living rock, can still be seen on a high place at the north end, near the shore. A well, cleared some years ago, had, at its bottom, ancient statuary. [there are] ancient stone walls. The whole area is covered with ceramics that show the site was occupied in Middle Minoan III (c. 1700-1570), Late Minoan I—III (c. 1570-1100) [Note: 'Late Minoan III (c. 1400-1100) is the Mycenaean Age'] and subsequently in classical times (5th-4th centuries B.C.).

The problem posed by ancient Cythera has not yet been answered. The island is rather remote from Egypt and Asia for men to have sailed there, for religious purposes alone. And yet it is hard to discover any more practical reason. Cythera is not remarkable for its natural resources. Meanwhile

we must reckon with Cythera as a site where all the evidence so far points to its importance as a religious centre with international attraction. Such shrines have remained well known throughout the ages. In classical antiquity, the oracle at Delphi was sought within a wide radius. Today Lourdes attracts from every continent people in need of help that they have not succeeded in finding nearer home.

Cythera thus became a centre for Egyptians and Semites and still other people, from Abasis along the Nile to Eshnunna beyond the Euphrates. Such visitors brought their influence to bear upon the Aegean, and on returning home, carried some Aegean culture with them. It is gratifying that Cythera is now being excavated by Professor George Huxley for the University of Pennsylvania Museum.

So much for Cythera, an alternative possible site is on the island of Thera. Or the two may be linked. Some justification for my guess that site number three would be in the south of Cyprus comes from the famous references to 'Aphrodite Kytherean, even as far as Cyprus' in the ancient literature. Also, Herodotus (Book I, 105) refers to the temple of Aphrodite Urania at Ascalon in Syria and says '[it is] the most ancient, I am told, of all the temples of this goddess. The one in Cyprus the Cyprians themselves admit was derived from it, and the one in Cythera was built by the Phoenicians, who belong to this part of Syria. In the latter (unquoted) part of his last footnote given above Gordon mentions that 'Phoenicians' is Herodotean language inclusive of the Minoans.

In passing, I might mention that a little island opposite Cythera is called Anti-Cythera and there a famous shipwreck was recovered from which came the miniature mechanical computer dated from the first century B.C. (concerning which Professor Derek Price of Yale University has written a good deal, including a 'cover story' for the Scientific American). This little computer is one of many survivals of ancient times which demonstrate conclusively that the conventional attitudes today to ancient technology are inadequate, and seriously underestimate the early peoples.

Now as for the site of Delos, I will give information here from H. W. Parke's authoritative book *Greek Oracles*<sup>14</sup> which will indicate its importance as an oracle centre in my postulated 'northern octave' of geodetic centres.

The other point which Dodona could urge against Delphi in its favour was

that it was the oracle of Zeus himself. Apollo was at most the son of Zeus, inserted somewhat awkwardly into the Greek pantheon. On the face of it his prophecies could not be as significant as the utterances of the father of gods and men. Delphi replied with an elaborate piece of theological propaganda. While not attempting to detract from the supreme position of Zeus, it was argued that Apollo was his chosen prophet. This doctrine appears first in the Homeric Hymn to Apollo, but not in the sections connected with Delphi. It is in the Delian hymn where the infant god bursts from his

swaddling clothes and cries 'May the harp and the bending bow be my delight, and I shall prophesy to men the unerring will of Zeus. In the rest of the same poem there are other references to Delos as an oracle-centre, a function which had lapsed in the classical period. But this part of the Homeric Hymn with its description of the Delian festival evidently dates back to an early stage of the archaic period - probably about 700 B.C.

The concept of Apollo as the prophet of Zeus may, then, have started in Delos, but it was certainly taken over and largely developed by Delphi.

Also - Delos, though later mainly famous as (Apollo's) birthplace, evidently once had been a centre of divination. 15

My contention that the oracle centres of Dodona, Delphi, Delos, Cythera, Knossos, and Cyprus are linked as a series - apart from the obvious facts that they are all separated from each other by a degree of latitude and are integral degrees of latitude from Behdet in Egypt and have demonstrable connections with Egypt in tradition or archaeology - is further cemented by another passage in H. W. Parke's book: 16

At Delphi, namely the site of the classical shrine of Athena Pronaia on the east of Castalia - as excavation has shown, there was not a settlement, but a cult centre going back to Mycenaean times. It is interesting archaeologically that a number of important finds from the earlier archaic periods show clear affinities or actual derivation from Crete. For, as we have mentioned, the Homeric Hymn to Apollo ends by describing how, 'Phoebus Apollo then took it in mind whom he would bring of men as his worshippers who would serve him in rocky Pytho. Then while pondering he was aware of a swift ship on the wine-dark sea, and in it were good men and many - Cretans from Minoan Knossos who offer sacrifices to the lord Apollo and announce the oracles of Phoebus Apollo of the golden sword whatever he speaks in prophecy from the laurel-tree.' Some scholars have seen in the evident archaeological links between early archaic Delphi and Crete a basis of fact behind this facade of legend, and it is possible that the cult of Apollo was introduced by sea from Crete.

In the Homeric Hymn quoted we find it specifically stated that Minoan Cretans (contemporaneous with ancient Egypt, of course, and who traded with the Egyptians) from Knossos took Apollo to Delphi, the site of an omphalos. And these Knossians are stated to respect oracles. And near Knossos is a site called Omphalos which is one degree of latitude south of the site of Kythera, which is one degree south of Delos, which is one degree south of Delphi.

Parke gives further information. 17 He mentions the connections well.

## THE SIRIUS MYSTERY

known to have existed between Delos and Dodona through what are known as 'the Hyperborean gifts' which were sent to Delos by way of Dodona from the mysterious northern Hyperboreans, whose land has never been located with any certainty at all, but which is thought by many to have been Britain. In Book II of Diodorus Siculus one finds a description of the Hyperboreans observing celestial objects through what sounds to me and some other scholars distinctly like a telescope. The description should be consulted by the interested reader.



Figure 18. Detail of mural from Pompeii reproduced by W. H. Roscher. The omphalos is identical to the one at Delos (see Plate 12, top right). Here the friendly omphalos-serpent is being harassed by a python.

Parke tells us: 'In the Cyclades Delos had once had an Apolline oracle of importance. One can suppose that this institution existed at the end of the eighth century, and may have dwindled away in the seventh century. By the time when Pisistratus and Polycrates in the latter half of the sixth century revived the sanctity of Delos, the oracle appears to have already ceased and was not restored.'<sup>18</sup>

It is a daunting prospect to try to set forth at proper length all the complex tangle of information concerning the northern octave and its many links with the Sirius tradition. It is impossible for me to do justice in this book to the subject of the astronomical knowledge of the ancients.<sup>19</sup>

From Hamlet's Mill we have a passage which is now relevant. The reader will have to accept on trust that the seven notes of the octave and the seven planets of ancient times were thought of in connection with one another. We cannot here take on the debate concerning early Pythagoreanism versus Neo-Pythagoreanism and the genesis of different concepts of 'harmony of the spheres'. Here is the passage. And Aristotle says (Rhet. 2.24, 1401a15) that, wishing to circumscribe a "dog", one was permitted to use "Dog star" (Sirius) or Pan, because Pindar states him to be the "shape-shifting dog of the Great Goddess [Gaia]". The amazing significance of Sirius as leader of the planets, as the eighth planet, so to speak, and of Pan, the dance-master (choreutes), as well as the real kosmokrator ruling over the "three worlds", would take a whole volume.<sup>20</sup> Now this reference to Sirius as the eighth planet, so to speak, is an extremely interesting clue. (In fact, there is some evidence to suggest that the ancients knew of the existence of the eighth planet Uranus because the Egyptians could



just have managed to observe it in the way suggested by Peter Tompkins in *Secrets of the Great Pyramid*.<sup>21</sup> And I believe both that this was probably the case and that Uranus was sometimes compared to Sirius B because they were both 'invisible'. Also, Sirius B orbits Sirius A as a planet orbits a sun, as I have mentioned before, for its orbital period is less than that of our own planets.

## THE ORACLE CENTRES

135

Uranus, Neptune and Pluto. The fact that Sirius B, a star, moves faster than Uranus, a planet, is an additional reason for the two to be thought of as similar. Sirius B was additionally compared in some obscure way to the innermost tiny planet Mercury, the nature of whose orbit was symbolized by the human intestines – see Figure 13 for this – and Uranus was the 'octave' expression of Mercury.)

Consider this 'eighth planet' theme in relation to the oracle centres. Dodona is the eighth oracle centre of the 'northern octave'. In music, the eighth note closes the octave by repeating the first note an octave higher. The 'eighth planet' would therefore repeat the first planet which was Hermes (in Latin, Mercury). Now it was Hermes (Mercury) who supplied the golden ram to Phrixus so that he could make his getaway to Colchis. And it was the oak of Dodona which was fitted into the prow of the Argo which returned the golden fleece. During the interval of the fleece's stay in Colchis the fleece rested 'in the grove of Ares (Mars)'. The important points to note are that the fleece went to Colchis under the auspices of the first planet, rested there under the auspices of (the planet?) Mars, and returned under the auspices of Sirius the 'eighth planet' with the oak of the eighth oracle centre in the Argo's prow. And we have already seen how Argo, if swung through a 90° angle, touches its prow first at Dodona and then points directly at Metsamor near Mount Ararat. But if an extended Argo has its prow touch Dodona and its rudder at Egyptian Thebes, the Argo may be swung to Ararat/Metsamor and touches its prow there too.

Parke says: 'On Asia Minor Didyma near Miletus is the only oracle-centre for whose activity we have some evidence in the sixth century'.<sup>22</sup> Miletus seems to be on the same parallel as Delos, just as Sardis is on the same parallel as Delphi.<sup>23</sup> And we have seen that Mount Ararat (having its associated centre at Metsamor) is on the same parallel as Dodona. There may be a 'north-eastern octave' to correspond to the 'northern octave'. But we shall see later that geodetic points exist over great stretches of territory – marked out from Behdet, the ancient Greenwich. (For instance, an arc swung through Aea in Colchis would pass through Mecca as well, if the compass point were on Behdet. A line from Egyptian Thebes to Dodona intersects the vicinity of Omphalos and Knossos on Crete. The lines connecting Thebes, Dodona, and Metsamor, form an equilateral triangle. A line from Behdet to Dodona intersects Thera. Also, a straight line passes through the three points Behdet, Mecca, Dodona. As for Mecca, I doubt that many Moslem scholars will be at all surprised to learn of these aspects of their holy centre. They know very well that the centre has geodetic aspects and the central shrine of the Kaaba dates from prehistoric times – they say it was established by the prophet Abraham.)



## THE ORACLE CENTRES

137

the end of the book. For Delphi determined the later fate of the Minyae, and it is their tradition which survives today in the former French Sudan. The explanation of this will be left to somewhat later.

Now, as to the omphalos stone and also Behdet. For these subjects we must turn to an amazing book published in 1971 *The Secrets of the Great Pyramid* by Peter Tompkins (with a scholarly appendix by Livio Stecchini). Tompkins tells us 24

The prime meridian of Egypt was made to split the country longitudinally precisely in half, running from Behdet on the Mediterranean, right through an island in the Nile just northeast of the Great Pyramid, all the way to where it crossed the Nile again at the Second Cataract. Cities and temples, says Stecchini, were deliberately built at distances in round figures and simple fractions from the tropic or the prime meridian. The predynastic capital of Egypt was set near the mouth of the Nile at Behdet, right on the prime meridian, at 31 deg. 30'. Memphis, the first capital of united Egypt, was again laid out on the prime meridian and at 29deg. 51', precisely 6 deg. north of the tropic. As each of these geodetic centres was a political as well as a geographical 'navel' of the world, an omphalos, or stone navel, was placed there to represent the northern hemisphere from equator to pole, marked out with meridians and parallels, showing the direction and distance of other such navels. In Thebes the stone omphalos was placed in the main room of the temple of Amon, where the meridian and parallel actually cross. For the ancient Egyptians to have laid out an absolutely straight meridian of 300° of latitude from the Mediterranean to the equator over 2,000 miles, and drawn two more equidistant, east and west, as boundaries of the country [see illustrations in the book], must have required an enormous amount of personnel and careful astronomical sightings. Even more sophisticated was their method of establishing longitude, as reconstructed by Stecchini.

With the aid of an elementary system of telegraphy, consisting of a series of beacons, the Egyptians, says Stecchini, were able to note what star was at its zenith at a certain moment, and flash the data, via a string of flares, to other observers, so many degrees to east and west. Because of the advanced geodetic and geographic science of the Egyptians, Egypt became the geodetic centre of the known world. Other countries located their shrines and capital cities in terms of the Egyptian meridian 'zero', including such capitals as Nimrod, Sardis, Susa, Persepolis, and, apparently even the ancient Chinese capital of An-Yang.

All of these localities, says Stecchini, were set and oriented on the basis

of the most exact sightings. The same applies to the centres of worship of the Jews, the Greeks, and the Arabs.

According to Hebrew historians the original Jewish centre of worship was not Jerusalem, but Mount Gerizim, a strictly geodetic point 4 deg east of the main axis of Egypt. It was only moved to Jerusalem after 980 B.C.

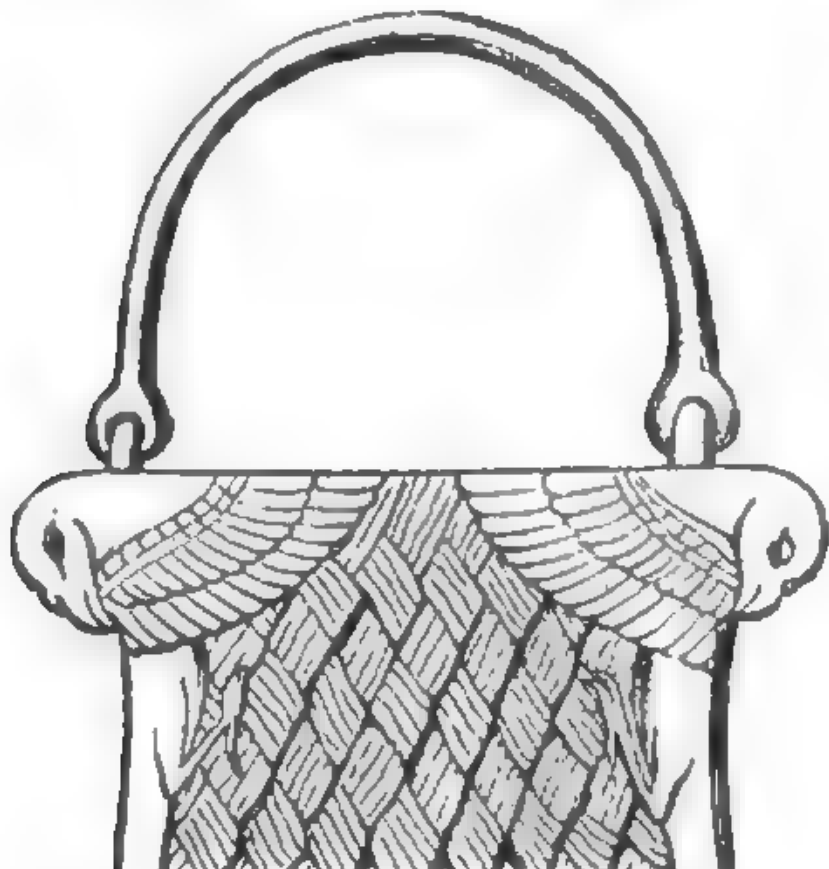
The two great oracular centres of Greece—Delphi and Dodona—were also geodetic markers according to Stecchini. Delphi is 7 deg and Dodona 8 deg north of Behdet, the northernmost part of Egypt, on the prime meridian of Egypt.

138

## THE SIRIUS MYSTERY

This is obviously where I got the original idea for my 'northern octave' from this brilliant observation of Stecchini's.

Readers who have pondered the strange story of Pharaoh Tutankhamen whose previous name had been Tutankhaten—and his father-in-law, Akhenaten



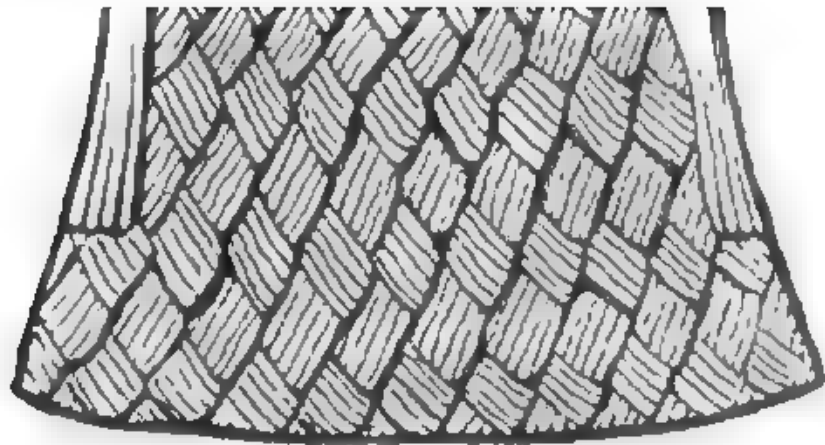


Figure 20 This representation of the sacred basket found at Khorsabad is important evidence connecting Oannes with the omphalos stone tradition. The basket, which was invariably carried by Oannes, is seen here with the two doves with heads turned away motif of the omphalos. The basket work is also seen to resemble the mesh which usually covers the omphalos.

## THE ORACLE CENTRES

39

and mother-in-law Nefertiti might do well to note that a geodetic-religious dispute lay behind Akhenaten's desire to build a new geodetic capital city, which he did, but outraged the priests in the process. Why were the boundary stones of this city later ferociously mutilated? Because the Pharaoh had tried to establish a variation on the geodetic system of Egypt (for some very sound reasons, of course) and those marker stones represented it quite literally.<sup>1</sup>

In Plate 12 the reader may see for himself the surviving omphalos stones of Delphi and of Delos<sup>86</sup> both of which are spread with 'nets' representing a latitudinal and longitudinal geodetic mesh.<sup>26</sup> It is this mesh which is probably carried at all times by Oannes (see Plates 6, 7, 8 and 9) as a 'basket'. For the 'warp and woof of the sacred basket of Oannes/Dagon' surviving as the Lykno's basket of Greek Demeter (who succeeded the Philistine fish-tailed Dagon as agricultural deity, keeping Dagon's 'basket') represent perfectly the warp and woof of latitude and longitude. The Dogon have traditions of the religious and mythological importance of warp and woof in weaving, and of sacred baskets 'which are not baskets', all of which may be found described in many places in *Le Renard Paie*.

In Plate 12 the reader may see the omphalos stone found by Reisner in the great temple of Amon at Thebes in Egypt. This stone was placed in the main room of the temple where the meridian and parallel actually cross.<sup>2</sup> In Figure 23 is a reproduction of a figure from an Egyptian papyrus of omphalos stones.

with two doves perched on top. These two doves are the standard glyph meaning 'to lay out parallels and meridians'.<sup>28</sup> They are the 'two doves' who flew to Dodona from Thebes according to the account of Herodotus.<sup>29</sup> Of course, the two doves are in fact carrier-pigeons. To keep in touch over such enormous distances, and to maintain prompt communication between oracle-centres which was essential to the successful operation of a coherent 'world-wide' religious network spread over thousand of miles, the only available means were carrier-pigeons. I am informed that carrier-pigeons could fly from Thebes to Dodona in about a day. To travel such a distance oneself by sea and land would take months. Daily communication between the Egyptian religious centre of Thebes and all its oracle 'colonies' would have been transacted by the very carrier-pigeons whom we see plainly depicted on omphalos stones by both Greek (see Plate 12) and Egyptian (see additionally Figure 24) representations and documented clearly by Herodotus. Also, I should imagine such instantaneous news coverage would surreptitiously find its way into the oracular pronouncements at the various centres and exercise a considerable political influence. For after all, there was hardly a king or potentate anywhere in the ancient world who would disregard an oracular order from the gods. Probably the political forces were totally ignorant of the 'hot news line' tucking away secretly in the local oracle centre's temple complex.

I realize that acknowledgement of all these facts is bound to evoke howls and cries of anguish from any of those archaeologists to whom a drastic revision of their ideas is more painful than would be an amputation of all their limbs without an anaesthetic. Such are the hazards which go with the addictive and opiate pleasures of submersion in a body of orthodox theory.

As the philosopher David Hume pointed out concerning the revolutionary discovery of the circulation of the blood by William Harvey: "It is remarked

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.40

## THE SIRIUS MYSTERY

that no physician in Europe who had reached forty years of age ever, to the end of his life, adopted Harvey's doctrine of the circulation of the blood, and that his practice in London diminished extremely from the reproach drawn upon him by that great and signal discovery. So slow is the progress of truth in every science, even when not opposed by factions or superstitious prejudices."<sup>30</sup>

It should be strongly emphasized that Dodona and Metsamor/Ararat are equidistant from Egyptian Thebes. The Greek ark landed at Dodona and the Hebrew ark landed at Ararat. The process of landing an ark, therefore, consists of starting at Thebes and going north to either of the two places which are 8 degrees of latitude northwards and which are joined to each other by a distance equal to their distances from Thebes. That may sound complicated

The fact is that an equilateral triangle is formed by the lines joining Thebes with Dodona and Ararat. These facts cannot possibly be an accident. There cannot be supposedly separate Greek and Hebrew traditions giving the landing points of the ark in their respective regions of the world, which then both turn out by chance to be equidistant from Thebes and the same distance from each other, as well as on the same latitude. Since Mount Tomaros at Dodona and Mount Ararat are both landing sites for an ark, this must mean that the tip of the prow of the ark literally does touch either of them when projected on the globe from Thebes. This may be seen clearly drawn by a cartographer in Figure 19.

Also founded from Thebes by flying doves, according to Herodotus,<sup>31</sup> was the Oracle of Ammon in Libya, known to be at the Oasis of Siwa. In Figure 15 we may even see a comparison of the line patterns made by joining Thebes, Dodona, and Siwa with each other, with the line patterns formed by joining certain stars in the constellation of Argo together. The pattern is seen to be identical. The site of Siwa may have been chosen simply to display this. In both instances we have the helm of the Argo as the starting point: in the celestial pattern we start from the star Canopus, identified with the Argo's helm, and in the geodetic pattern we start with Thebes, which is the site for the global Argo's helm when projected either to Dodona or Ararat. But there is another means of projecting the Argo, using Behdet, to convey other meanings bearing in mind always the interconnecting relationships of the sites, with Behdet equidistant from both Siwa and Thebes, and also on the northernmost point of Egypt and (see Figure 16) on the prime meridian dividing Egypt as demonstrated by Livio Stecchini.<sup>32</sup>

When the helm of the Argo is placed at Behdet (near the geographical Canopus) rather than at Thebes, with the prow touching Mount Ararat, if we swing the prow across to Dodona through an arc of exactly 90° (a right angle), we find that the prow is then too long and must be shortened. In fact, for this extraordinary point, documentary evidence actually exists in a Babylonian text. In Chapter Three we cited the passage in another context, and I will here return to it. It is from the brief Sumerian epic poem 'Gilgamesh and Agga', of extreme antiquity, the surviving tablets preserving it dating from the first half of the second millennium b.c. This Sumerian poem contains, within the framework of what seems to be a local political diatribe, a certain bizarre core of material which no scholar has ever satisfactorily interpreted.<sup>33</sup> (The political aspect of the poem has, in my opinion, been overemphasized due to Jacobsen

## THE ORACLE CENTRES

141

and Kramer's understandable excitement at finding in the poem actual evidence of the existence 4,000 years ago of a bicameral parliament, which Kramer wrote up as one of the world's 'firsts' in his excellent book, *History Begins at Sumer* <sup>34</sup>)



Babylonian Zodiac (?)

Figure 21 The design carved on to the Babylonian omphalos. Rawlinson suggested that the design was of a zodiac. He thought it obvious that the figures were of constellations. It would seem definitely to be a star map, but it is not necessarily true that the intention is to represent the sky accurately. Attempts to interpret such complex maps (the Egyptian zodiac of Denderah being a notorious example) usually fall short, so I will not here tempt the fates.

The poem mentions (line .04) a 'fleeing bird' which I believe may be a reference to the carrier-pigeon network which we have just discussed. But the most important elements in the poem seem to me to be two apparently contradictory statements:

(1) 'The prow of the magurru-boat was not cut down' (line 80)

(2) 'The prow of the magurru-boat was cut down.' (line 98)

In Chapter Three I discussed why the magurru-boat and the magan-boat of another poem were in fact that boat which was later known as the Argo.



.42

## THE SIRIUS MYSTERY

## THE ORACLE CENTRES

.43

I believe that statement (1) refers to the Argo as projected from Behdet to Ararat, and that statement (2) refers to the projection of the Argo from Behdet to Dodona. The latter requires the cutting down or shortening of the prow lest the Argo extend beyond Dodona.

As long as the prow was not cut down in 'Gilgamesh and Agga', we find that 'The multitude did not cover itself with dust' in mourning. For the projection was still extended over the north-west of Mesopotamia, the Sumerian homeland being at least in the general vicinity. The Behdet-Ararat line actually intersects the famous oracle centre of Hierapolis<sup>35</sup> which I propose as the fifth eastern oracle centre at  $36^{\circ} 30'$ .



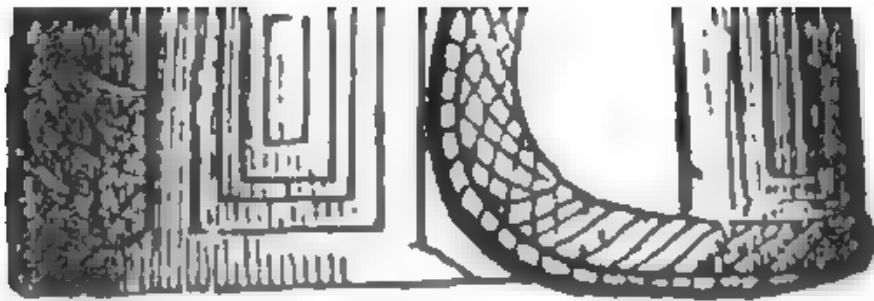


Figure 22 A Babylonian omphalos stone (from Rawlinson) A flattened view of its entire conical design is seen in the accompanying illustration

The poem says also, as long as the prow is not cut down, that 'The people of all the foreign lands were not overwhelmed'. In other words, the projection did not fall over foreigners such as those living in Greece. It did not literally 'overwhelm' people of foreign lands, meaning overshadow or pass over them.

However, when the prow was shortened, the projection of Argo left Mesopotamia altogether, and then 'The multitude covered itself with dust' and the people of foreign lands were overwhelmed. It is at this point that Gilgamesh says to Agga, 'O Agga, the fleeing bird thou hast filled with grain' (in other words, fed the carrier pigeon in preparation for his flight to another and different oracle centre, namely Dodona rather than Metsamor). The entire poem is based round a repeated refrain which Kramer calls 'a riddle'<sup>36</sup> and which concerns the digging and completing of wells, of the small bowls of the land, and wishes to complete the fastening ropes. At this point only a Sumerian scholar can tell us whether there are any other shades of meaning or alternative readings which might make the passage clearer, following the clue that 'the fastening ropes' may refer to the rope-like mesh which we see, for instance, on the omphali of Delphi and Delos. Can the small bowls of the land be either geodetic points or their markers, the omphalos stones themselves, which are like small bowls? Could 'small bowls' be an accepted expression for omphali in Sumerian parlance? Answers to these questions are entirely beyond the competence of any but a dozen or so scholars. Even experts in the Akkadian language cannot help us here, with non-Semitic Sumerian. And even answers from one of the experts might be wrong through human error. Sighing, therefore, at the difficulty of our subject-matter, let us look again at Egypt.

Stecchini says<sup>37</sup> 'Because Egyptologists have ignored the issue of geodetic points and of the linear units, the figure of the revolutionary Pharaoh Akhenaten has turned out to be the most mysterious and controversial in the long history of the Egyptian monarchy'. He then makes some extremely critical remarks about Cyril Aldred and others and continues:

Because they have resisted accepting the soundly documented facts, established scholars have devoted their energies to debating theories such as that Akhenaten was impotent, was a practising homosexual, or a woman.

masquerading as a man, there are historians who profess to be informed about the intimate relations between him and his wife the beautiful Nefertiti. Since the picture of Akhenaten has remained indefinite and blurred, scholars have used it to project their own emotions. Those who do not like Akhenaten present him as a psychopath and dispute about the clinical definition of his illness. If instead of trying to imagine what were the hieroglyphic notes of the psychoanalyst of the royal family, we consider the documented facts, the most important action in the revolutionary reign of Akhenaten proves to be the establishment of a new capital for Egypt, the city of Akhet Aten, 'Resting-point of Aten'. The miles-long remains of the buildings of this city have been found and excavated in the locality known today as Tell el Amarna. During the reign of Akhenaten a substantial percentage of the national resources was dedicated to the construction of this city.

Scholars of the last century, who had not yet adopted the psychologizing

.44

## THE SIRIUS MYSTERY

fashion, at least recognized the political meaning of the shift in the location of the capital of Egypt. Akhenaten intended to cut at the root of the power of the priests of the Temple of Amon in Thebes, who through their control of the national oracle, identified with the god of this temple, had usurped the royal functions. But what these scholars did not know is that the Temple of Amon was the geodetic centre of Egypt, the 'navel' of Egypt, being located where the eastern axis (32 deg 38' east) crosses the Nile, at the parallel which is at 2/7 of the distance from the equator to the pole (25 deg 42' 51" north) and that the god Amon was identified with the hemispheric stone which marked this point.

The new city which was intended to replace Thebes as the capital and geodetic centre of Egypt was planted in a position which seems undesirable in terms of what we would consider the function of a capital city. Some scholars have interpreted this fact as further evidence of the mental derangement of its founder. The new capital, for the god Aten, who was raised to the status of the one true god, was set at latitude 27 deg 45' north, at the middle point between the northernmost point Behdet and the southern limit of Egypt at latitude 24 deg 00' north. Akhenaten wanted to prove that Thebes could not properly claim to be the geodetic centre of Egypt and that he had chosen the geodetic centre conforming to an absolutely rigorous interpretation of maat, the cosmic order of which the dimensions of Egypt were an embodiment. In order to follow absolutely exact standards of measurement, he reverted to the pre-dynastic geodetic system which counted in geographic cubits starting from Behdet. In terms of the system based on the pre-dynastic capital of Behdet, there could be no

question that Akhet Aten is the true and just' navel of Egypt

This conclusion implies that one should re-evaluate the entire historical role of Akhenaten, taking as the starting point what he himself considered the initial step in his program to establish true and just conformity with maat. There is a possibility that his revolutionary reforms, which extended from religion to art and family relations, were understood as a general return to pre-dynastic ideas and practices.

Note the fact that Thebes had established itself as the navel of Egypt but not on the basis of the 'Behdet system' which Akhenaten apparently tried to revive. It shows how ancient the 'northern octave' must be if it was based on the 'Behdet system' whereas Thebes was not. The clear involvement of Thebes in the 'northern octave' system is not exclusive but is complementary to that of Behdet. In Herodotus, Book Two (54) we find this significant tale

At Dodona the priestesses who deliver the oracles have a story: two black doves, they say, flew away from Thebes in Egypt, and one of them alighted at Dodona, the other in Libya. The former, perched on an oak, and speaking with a human voice, told them that there, on that very spot, there should be an oracle of Zeus. Those who heard her understood the words to be a command from heaven, and at once obeyed. Similarly the dove which flew to Libya told the Libyans to found the oracle of Amon, which is also an oracle of Zeus. The people who gave me this information were the three priestesses at Dodona: Promeneia the eldest, Timarete the

## THE ORACLE CENTRES

.45

next, and Nicandra the youngest, and their account is confirmed by the other Dodonaeans who have any connection with the temple.

It is really interesting to see how chummy Herodotus was with the priestesses of Dodona, for Plutarch centuries later was to be similarly chummy with the priestess Clea of Delphi, as we have seen already. Obviously these priestesses were really good informants for aspiring historians. Just how vividly accurate the Dodonaean story really is, will in a moment become even more clear. But as for the question of Thebes versus Behdet, tied in as it is with the Akhenaten question, I beg to bow out of that controversy. Put me down as having 'no opinion'.

We must note Stecchini's remarks about Delphi as follows: 38

The god of Delphi, Apollo, whose name means 'the stone' was identified with an object, the omphalos, 'navel', which has been found. It consisted of an ovoidal stone. The omphalos of Delphi was similar to the object which represented the god Amon in Thebes, the 'navel of Egypt'. In 1966 I

presented to the annual meeting of the Archaeological Institute of America a paper in which I maintained that historical accounts, myths, and legends, and some monuments of Delphi indicate that the oracle was established there by the Pharaohs of the Ethiopian Dynasty. This is the reason why the Greeks portrayed Delphos, the eponymous hero of Delphi, as a Negro.

Stecchini also explains his theory that the oracles originally functioned through the operations of computing devices.

An object which resembles a roulette wheel, and actually is its historical antecedent, was centred on top of the omphalos. The spinning of a ball gave the answers: each of the 36 spokes of the wheel corresponded to a letter symbol.

In studying ancient computing devices, I have discovered that they were used also to obtain oracular answers. This is the origin of many of the oracular instruments we still use today, such as cards and ouija boards.

The roulette wheel of Delphi originally was a special kind of abacus for calculating in terms of angles.

The following information from Stecchini is also both surprising and informative with regard to the story of the Argo, Colchis, etc. 39

Very revealing is that a base line was marked along parallel 45 deg. 12' north on the north side of the Black Sea. This base line started from the mouth of the Danube, cut across the Crimea, and ended at the foot of the Caucasus. Beginning from this base, Russia was surveyed for a length of 10 degrees, along with the three meridians which formed the three axes of Egypt, up to latitude 55° 12' north. The river Dnieper was understood to be a symmetric counterpart of the Nile, running between the same meridians. Key positions along the course of the Dnieper were identified with corresponding key positions along the course of the Nile, up to the point of transferring Egyptian place names to Russia. The information about the existence of this geodetic system is provided by the description of a map of Russia which is based on it. The description of the map indicates that it was used at the

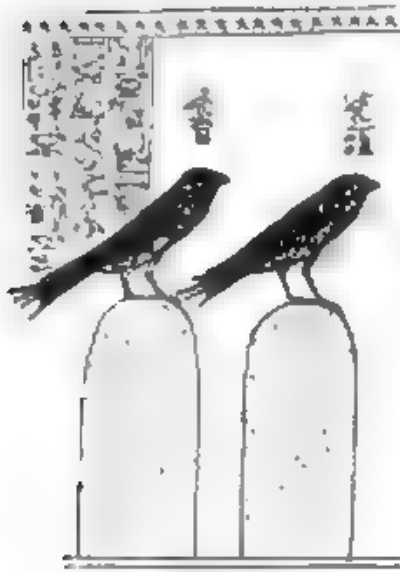


Figure 23

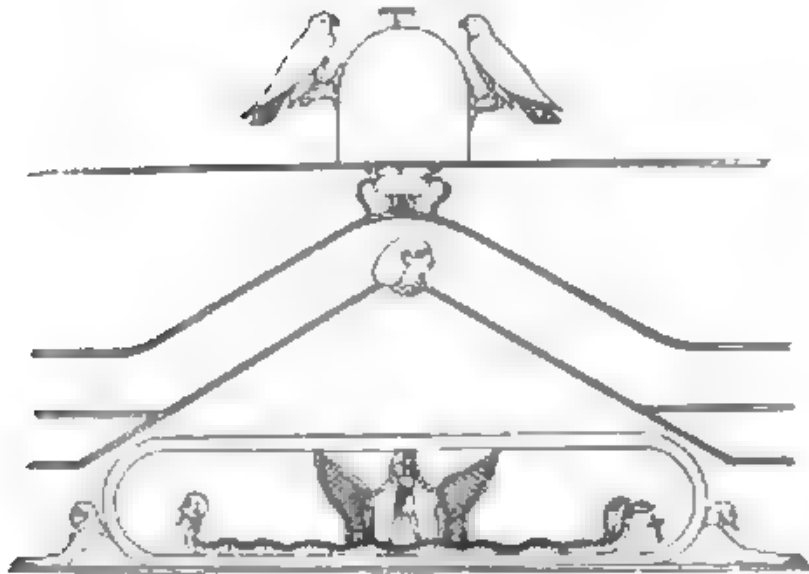
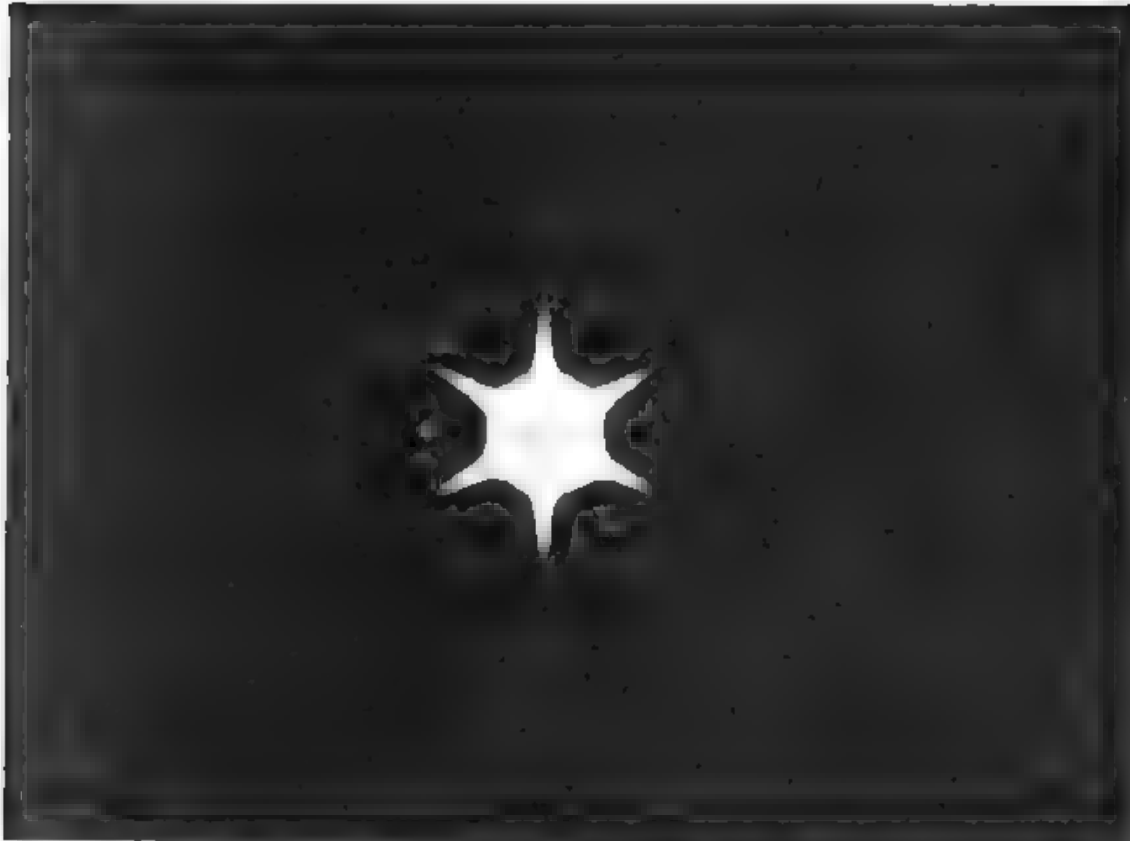


Figure 24

end of the sixth century B C but the map may be older, in any case there are other sources of information about the base line which indicate that it was marked in very early times

In Tompkins and Steccchi's marvelous book<sup>40</sup> there are some first-rate photographs and drawings of stone omphalos navels which are extremely helpful in trying to understand all these matters. It makes all the difference to see the fantastic nature of these objects, representative as they are of a highly developed ancient science which until recently was completely unknown. These are reproduced here in Figures 23 and 24 and Plate 12



1. A family portrait: the first photograph ever taken 1920 of Sirius B, which is the tiny dot to the lower right of the larger star. Sirius itself are seen here extending off to left and right. See Notes to the Plates. (Dr. Irving Lindenblad, U.S. Naval Observatory)



2 The four Dogon priests who revealed  
the Sirius traditions to anthropologists

Manda D'Orosongo

Innekouzou





Onigronlou

Yébéné





3. Two Dagon's Haunts in May. Above the village of Songhu. Below the cliff and village of Banan. *A. C. G.*

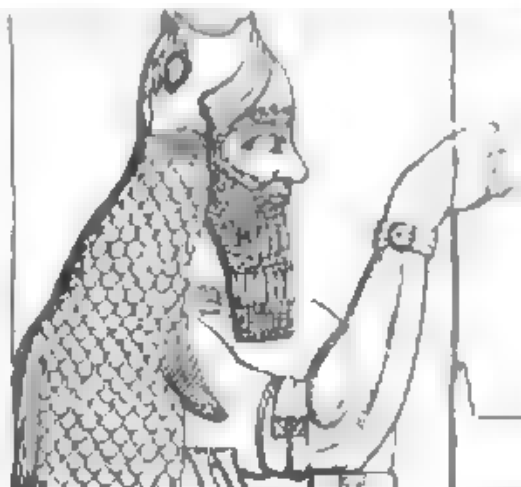


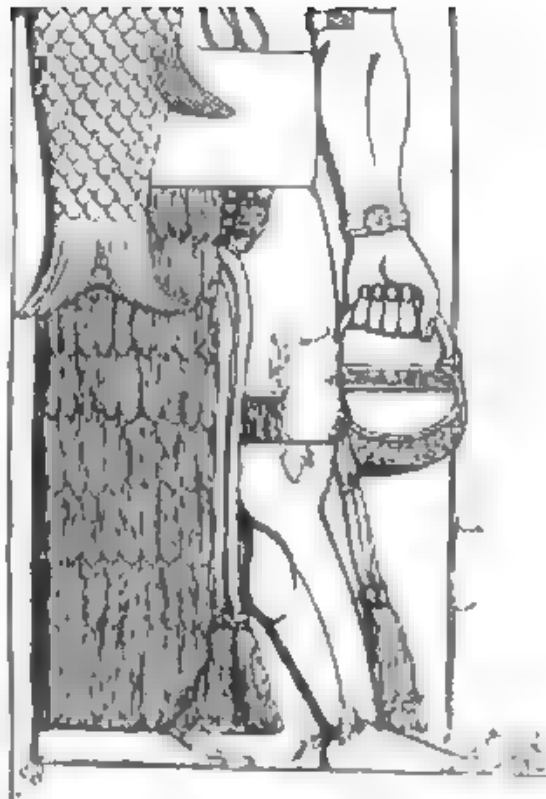


4. Above: a Dagon priest's house. A libation has been offered to the gods and dripped down the front of the house. Below: Dagon (left) dances in this procession to the village of Konakun, 4/1/1900.



5. The Egyptian goddess Isis, showing the small fishtail in her headdress.



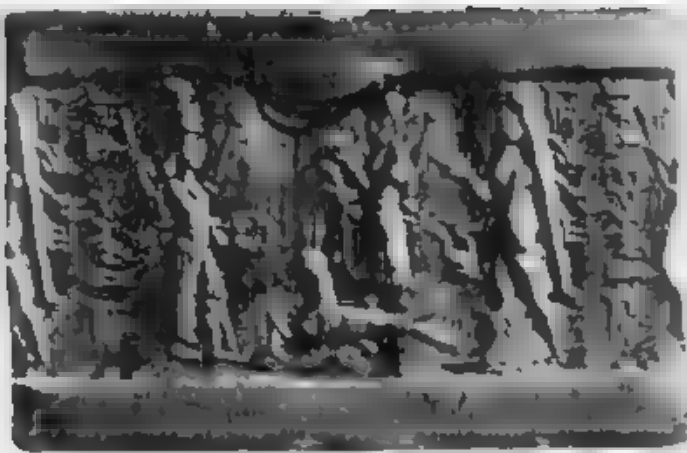


6. The Babylonian semi-dæmon Oannes, a fish-tailed amphibious being from the heavens who, according to the Babylonians, founded civilization on earth. From *Nimrud*

7



8



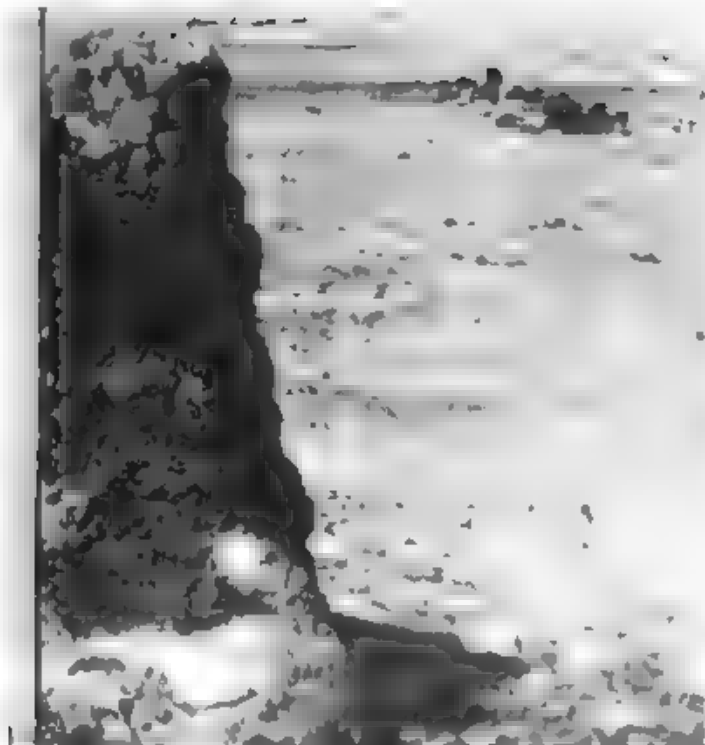
7, 8 and 9. Further representations of the amphibious heavenly being, Oannes. Two are from Assyrian cylinder-seals and one shows the remains of a giant statue of Oannes found at Kouyunuk. Staatliche Museen zu Berlin, Preussische Altertumskammer, Leyard (1854)

9





10 The towering mass of Mount Ararat in Turkey, where the Biblical ark landed  
*Simon Halpin*



1. The meadow of Metsamor, a  
typical example of the ancient and  
modern character which has  
been preserved in all  
the ancient and modern  
times.



I. Delphi, Naxos

19. Omphalos (navel of the world) from  
ancient Delphi, Naxos, and  
Mitsamir. See Notes to the Plates.



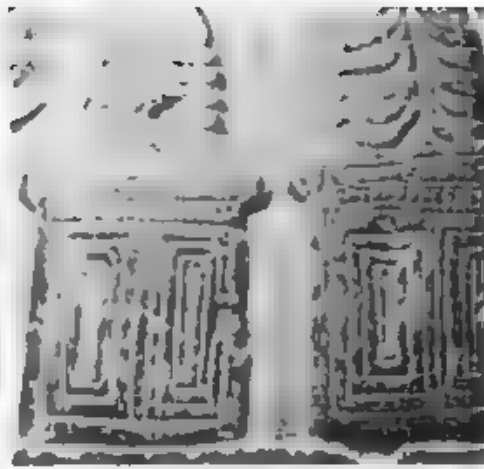
II. Delphi



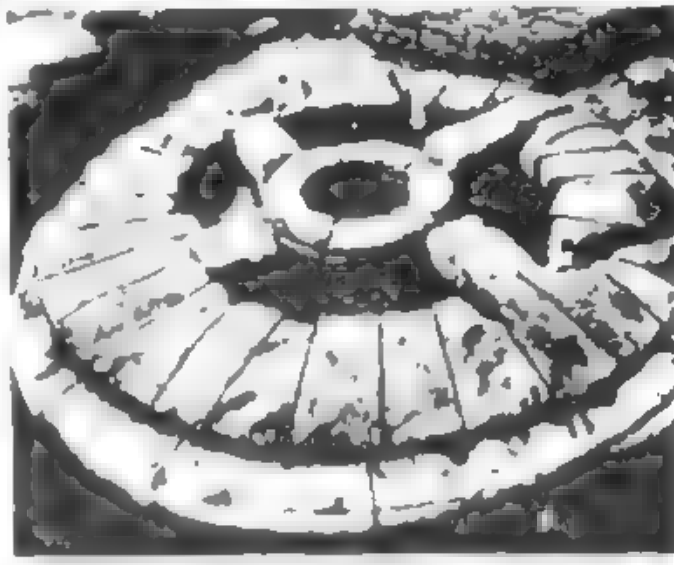
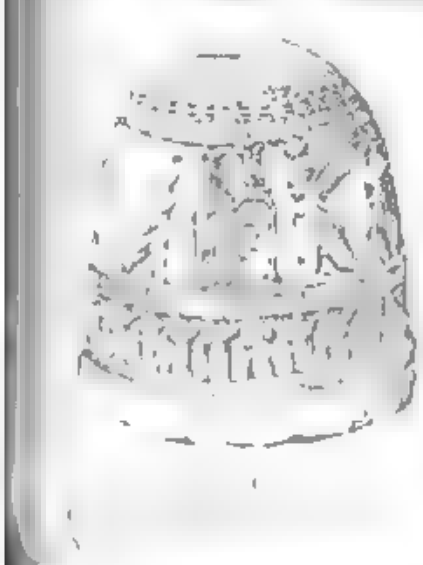




III: Miletus. Seated. Paion relief with  
(Delos on same site etc)

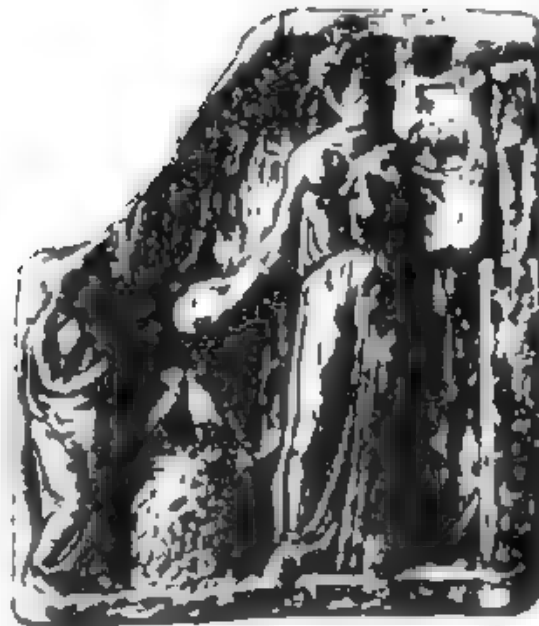
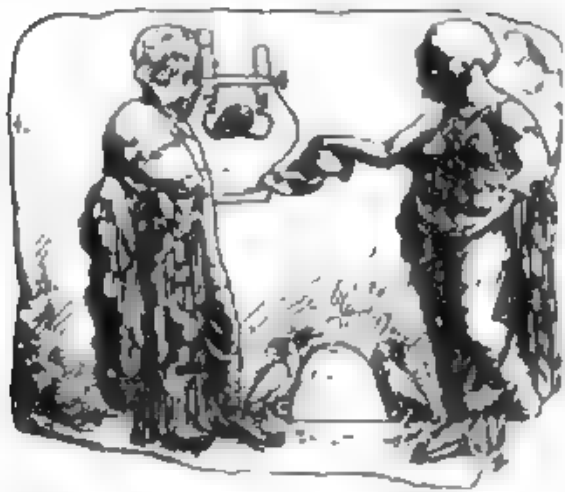


IV: Babylonia. Michael Hofford





46 The entrance to the site of the pyramid of Khufu, with a view of the entrance to the pyramid of Khafre in the background.



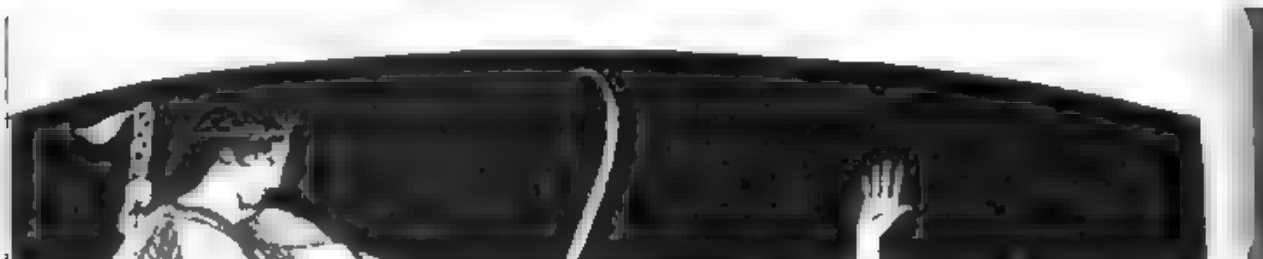
- 14 Bas reliefs and coins showing evidence of oracle centres and use of omphalos ('navel') stones. Two coins, bottom right, from Delphi show the famous 'E' suspended in the centre of the entrance to Delphi's Temple of Apollo (Ref. Appendix IV). See Notes to the Plates. *British Museum*



15 Jason, Medea, and the teeth of the dragon, from an ancient vase painting.  
Notes to the Plates. Alzova



(b) Jason and Medea with a winged Goat (Fleece) after all, 1953  
 (Michael H. Jones, See Notes to the Plates)





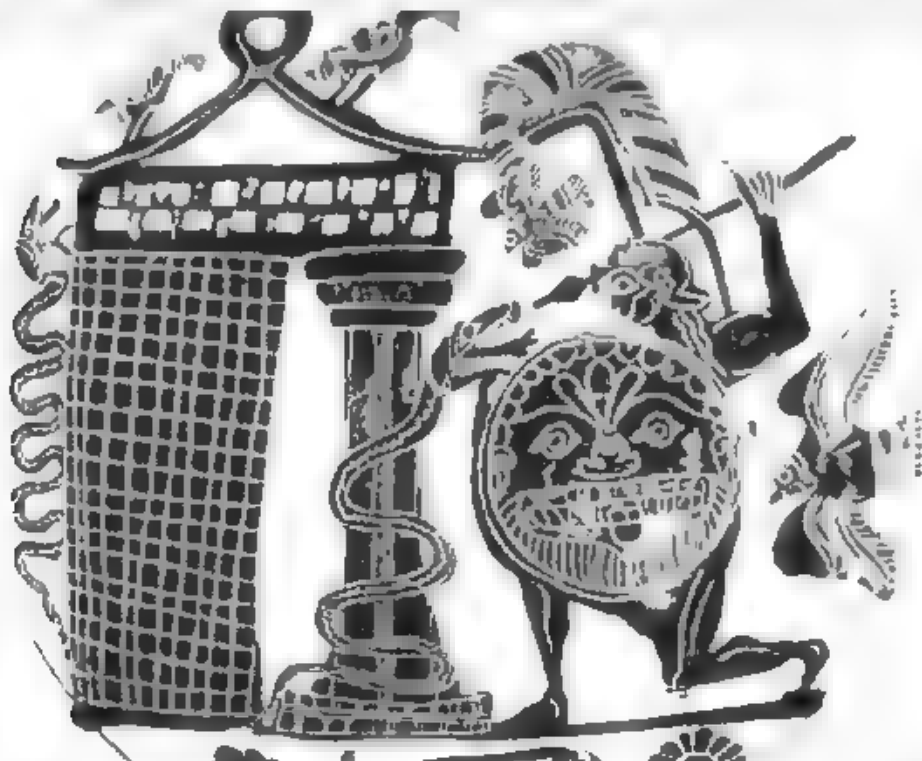
- 17 Above: Actaeon hunted down by Artemis/Diana, and the fifty hounds of hell  
*Demetrius Fustel de Ducloux*. Below: Artemis stands by as the infant Apollo, held by  
 their mother Leto, lets fly an arrow at the Python. *Manzetti*. For both, see Notes  
 to the Plates.





18. Above: an ancient representation of the construction of the ship *Argo*. On the left the goddess Athena bestows the oak timber of Dodona. Argus is hard at work on the prow, which was to contain the oak beam. An oak tree graces the scene with a

branch pointedly missing. *Alman*. Below an ancient Babylonian cylinder seal which may show the sowing of the serpent's dragon's teeth (*United Institute, Jerusalem*). (Change). See Notes to the Plates.



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See Notes to  
Plates







## Notes to the Plates

Plate 1 The scientific achievement represented by this extraordinary photograph is considerable. Until 1970, no photographic record of the small white dwarf star Sirius B existed, despite attempts over several decades to obtain one. With much ingenuity, Dr Irving W. Lindenblad of the U.S. Naval Observatory in Washington, D.C., finally devised a technique which made this photograph possible. Lindenblad (1970: see Bibliography) says "simultaneous observation of Sirius A and B by conventional photography has always presented a problem due to the small separation and large magnitude difference between the components, and because of various emulsion effects. Since Sirius A is enormously brighter than Sirius B, it is easily understood that it washes out the smaller star which orbits it. How, then, to photograph the smaller star at all?"

Dr Paul Murdin of the Royal Greenwich Observatory has provided some explanatory notes on Lindenblad's photograph and given his permission for me to quote them here. "The six spikes on Sirius A are caused by the hexagon used on the front of the telescope. The point of making the photo in this way is that Sirius A is about 100 times as bright as Sirius B so that its light tends to spread out over Sirius B rendering it invisible. By using a hexagonal lens (actually a 26-inch circular lens with a hexagonal mask) in his telescope, Lindenblad was able to compress the star image in certain directions: he chose the orientation of the hexagon so that Sirius B's image fell in one of the compressed zones and was thus able to be seen. The wire grating referred to by Lindenblad makes the small images of Sirius A on either side of the bright one (there are small images of B too, but they are too small to be visible). The point of this is that the bright image of Sirius A (the "zero order" image) is so big that Lindenblad couldn't measure the position of Sirius B with respect to A. He made first and second order images, measured B with respect to them and was able to calculate where B was with respect to the zero order image of A."

These calculations enabled Lindenblad to angle his hexagonal aperture so that Sirius B would "hit" a depressed area of Sirius's light: a dip where the light was teased inwards, and Sirius B could peek through. But it could only peek through if Lindenblad had first found it! The reader can by this point appreciate how clever Lindenblad had to be in order to achieve any results at all. However, these were not all of his problems. There was a serious emulsion contraction effect for the photograph, with such close images. Lindenblad (1970) says, "The important correction to the separation of the components of Sirius due to emulsion contraction, or the Ross (1924) effect, depended, in van Albada's method, upon measurements of second-order [images]. However, this procedure could not be employed in the present work because the dispersion affecting the second-order images generally rendered them unmeasurable. Consequently, another technique for determining the emulsion contraction was devised."

This is a perfect example of technological feats taking place constantly behind the scenes in order to produce results which the public then take for granted, with no appreciation of the difficulties involved. This photograph could have been reproduced with no comment or explanation, but the story behind it is part of the saga of the attempt to unravel the mysteries of Sirius. So loth has Sirius been to give up her secrets that she has denied us even this photograph until 1970. All the more reason to wonder at the Dogon, who, oblivious of our scientific labours, have always drawn pictures of

Sirius in the sand, with its companion – nothing to it!

Plate 12 Top left: The beautiful omphalos stone found at Delphi in Greece, covered in the mesh thought to symbolize the latitudinal and longitudinal grid on the Earth (For an exhaustive treatment of that theory, see *Secrets of the Great Pyramid* by Tompkins and Stecchini, particularly Appendix by Stecchini )

Top right: The superb omphalos stone discovered at Delos, which incorporates the Delian palm design (Reproduced in W. H. Roscher: *Neue Omphalosstudien*, Leipzig, 1915 )

Middle left: Relief discovered at Miletus in Asia Minor. The figure of Apollo is resting on an omphalos stone (and an actual omphalos stone has also been discovered at Miletus) covered in mesh, while a second, smaller omphalos stone with a serpent is seen in foreground. The palm is prominent here again. Miletus is on the same parallel as Delos, and the palm is the 'tree-code' for that latitude in the oracle octaves schema. Delos is the western centre and Miletus is the eastern centre at 37°30'. The nearby site of Branchidae (also known as Didyma) to the south seems to have adopted the oracular functions presumably associated with Miletus itself originally. This relief appears as Figure 101 (the last in the volume) page 411 of *Das Delphinion in Milet* by Georg Kawerau and Albert Rehm, Berlin, 1914. Roscher also reproduced it. Kawerau and Rehm say with relation to it page 410: 'We have already noted here in later periods the distinctive likeness of Pythian Apollo which is universally known, and there is nothing extraordinary in finding this cult image of the Delphinion, the omphalos-and-serpent

Middle right: Two Babylonian altars to the god Anu which bear what appear to be omphali

Bottom left: An Egyptian omphalos stone found in the temple of Amon at Napata in Nubia (See *Journal of Egyptian Archaeology* Vol. III, Part IV, 1916, page 255 ) This drawing is reproduced by W. H. Roscher in *Der Omphalosgedanke*, Leipzig, 1918 as Figure 6. Roscher says of the stone: 'On the 21st of April, 1917, I received a letter from Professor Günther Roeder, now Director of the Pelizaeus Museum in Hildesheim saying that Reisner (Harvard University) had, in excavations for the Boston Museum at Gebel Barka (Napata) in the Sudan, found a stone in a temple of the Nubian Merotic kings which was the omphalos of the Amon-oracle of Napata.'

Bottom right: Another Egyptian omphalos marker reproduced from Tompkins and Stecchini (see Bibliography)

Plate 14 Top left: Votive relief of fifth century b.c. from Sparta, Apollo and Artemis, between them an omphalos flanked by two doves with their heads turned away in the customary manner for these scenes. (From Plate VII, No. 4, of W. H. Roscher, *Omphalos*, Leipzig, 1913 )

Centre top: Votive relief from Aigina, showing omphalos with two doves, their heads turned away (From Plate VIII, No. 3, of W. H. Roscher, *Omphalos*, Leipzig, 1913 )

Top right coin: Coin from Delphi showing Apollo sitting on the omphalos stone and leaning on his lyre. He holds a laurel branch, which is the 'tree-code' for Delphi. Note the clear differentiation of trees in this compared with the earlier Delos and Miletus examples of Plate 12; at Delphi the laurel is appropriately shown, whereas Delos and Miletus display the palm. This coin is from Imhoof-Blumer's *A Numismatic Commentary on Pausanias*.

Two bottom left hand coins: Two further examples of omphalos on ancient coins, with serpents and geodetic mesh visible; both in British Museum. One is from Delphi and the other from Pergamum.

Two bottom right hand coins: Two coins from Delphi showing the entrance to the Temple of Apollo in ancient times. The letter 'E' hangs suspended in the entrance way. It is the second vowel, and Delphi is the second oracle centre in descending order (the ancient octave was taken as descending rather than as ascending – the ignorance of which fact has led many modern experts astray when trying to unravel the complex

ities of Pythagorean harmonic theory). These two coins may be found reproduced also in Imhoof-Blumer (above). The second of these coins is to be found in the Copenhagen Museum, while the first was in Dr Imhoof-Blumer's private collection in the last century, and its fate today is unknown to this author.

Plate 15: Painting from ancient vase in the Etruscan Museum, Rome. Jason apparently being vomited forth by the serpent/dragon, rests on the serpent's teeth. Serpent's tooth is euphemism for Sirius (see Chapter Seven). Looking on is a female figure in serpent-headed robes, holding an oracular dove; she may be Medea or a goddess. In the background the golden fleece is seen suspended in the grove guarded by the serpent. Note that the breastplate of the female figure, on which is a fanged Gorgon's face, is composed of scales identical to those of the serpent/dragon. On her helmet is the Greek sphinx (a mythological being associated with Greek Thebes). Though the elements can here be identified in this way, the story implied by them cannot so easily be unravelled. The author has not been able to learn the mythological incidents referred to in this curious vase.

Plate 16: The ram is in the crucible, its fleece presumably being transmuted into gold in what we would call an alchemical sense. Was there such a thing as alchemy at this time in history? Alchemy is generally thought of as a mediaeval discipline. But perhaps the attempt to transmute base materials into gold is an ageless concept, and in antiquity it could have been less concerned with chemistry and more with symbolism, as I suspect is the intention here. (No mediaeval alchemist ever put a ram in the dish for this purpose!)

Plate 17: Above: The goddess Artemis sets the hounds of hell upon Actaeon and slays him. She holds the bow of Sirius the Bow Star. The hounds are the hounds of Sirius the Dog Star. She is herself, in this guise, a Greek version of Sirius the goddess. But the tradition has become confused and fragmented by the Greeks, broken down into elements which are used to construct other myths. Artemis is not generally a representation of

Sirius, but of the moon. The bow and the dogs are here merely left-over trappings from an earlier forgotten symbolic system. (From a red-figured vase in the Berlin Museum c. 470 B.C.)

Below: The infant god Apollo, four days after his birth, shoots an arrow at the serpent Python from his mother's arms. However, this scene is not Delphi but Delos, for the palm trees are the 'tree-code' of Delos. This Attic vase painting provides important confirmation that the story, which was supposed to have occurred at Delphi, was also linked with Delos. If Python was not only at Delphi but at Delos as well, then Python is a concept rather than a creature. This is all further evidence for the geodetic oracle octave which includes both Delphi and Delos, which are one degree of latitude apart. Delos had ceased to have any function as an oracle centre by about 600 B.C., which helps one appreciate the antiquity of the system, since Delos had no oracular functions at all by the time of classical Greece, when Socrates was gadding about the agora in Athens.

Plate 18. Below: This is one of the most interesting cylinder seals to survive from the Babylonian culture. It is reproduced in Henri Frankfort, *Cylinder Seals*, Plate XX, and in *Sumerian Mythology*, Plate XII, by Samuel Noah Kramer, where Kramer says of it: '... two gods are guiding a plow, which is perhaps drawn by a lion and a wormlike dragon.' Frankfort says of it: 'Two gods plowing, one holding a plow, the other driving span (consisting of snakelike dragon and lion) with left hand, which either holds or is shaped like a scorpion, bird, eight pointed star, and crescent in field.' It is Plate 62 in Frankfort's later book *Stratified Cylinder Seals*. It is Akkadian style, Late Agade period in date.

This cylinder seal is such an important item of evidence that it requires extended comment. The lion is the earth-lion well known as the earth goddess's symbol from the ancient Near East. (See, for instance, *The Syrian Goddess* by Strong and Garstang.) But note that directly beneath the symbol of a star, ploughing is taking place, and leading right down to the plough blade is the strange form of a serpentlike dragon. It looks almost as if the mouth of the serpent/dragon is being ploughed into the ground. And thus, I suspect, is exactly what is intended. For what seems to be represented is the act of ploughing and sowing the serpent's teeth, which we know to be a hieroglyphic pun in Egyptian for 'the goddess Sirius', we also know that the growing up from the ground of the 'serpent's teeth' is another pun for the rising over the horizon of the star for which 'serpent's tooth' is the other meaning, i.e., Sirius. Its once-yearly rising was the basis of the Egyptian calendar.

If we assume this to be the case, the figure whose hand has become a scorpion can be explained. Obviously, the constellation Scorpio is intended, which is approximately a third of the sky 'round' from Sirius. From the ancient Greek astronomical writer Aratus, we know that when Scorpio rises, it chases Sirius and Orion away below the horizon. He describes it as follows (*Phaenomena* 634-80):

'The winding River (the constellation Eridanus near Orion) will straightaway sink in fair flowing ocean at the coming of Scorpio, whose rising puts to flight even the mighty Orion. Wherefore, too, men say that at the rising of the Scorpion in the East Orion flees at the Western verge... what time all the rays of the mighty Dog (Sirius) is

in this constellation) are sinking and all of Orion setting, yea, all the Hare (the constellations Lepus) which the Dog pursues in an unending race '

The disappearance below the western horizon, then, of the 'serpent's tooth' (Sirius) which is going into the ground (to 'grow up' from it again in 70 days' time at its heliacal rising) seems to be indicated here, for the figure representing the sky has had his left hand (the east) become Scorpio, while his right hand (the west) is swallowing the 'serpent's tooth'. Over this proceeding of the setting of Sirius presides, as would be expected, the earth lion itself which pulls the plough that makes the furrows (three of which are visible) into which will be swallowed that fast-disappearing star just above the plough-blade. The crescent may be taken as an indication of the waning of the light of the star almost to vanishing point not surprising as the moon is a 'front man' for Sirius in many myths. (Kramer thought, because of the ploughing, that this scene involved gods of vegetation.)

Plate 1g. An extremely important representation in the Louvre. Cadmus of Thebes (Greek Thebes, that is) is seen slaying the serpent/dragon. Its teeth are almost more prominent than it is. Cadmus seems to represent the constellation Orion, for beneath his feet figures prominently a hare which appears to be meant as the constellation Lepus. As if to emphasize the stellar symbolism, on either side of Lepus are what appear to be stars. The serpent itself, to the left and slightly lower than Cadmus, would therefore correspond with the position in the sky of Sirius. (The reader should be advised that in Figure 12 of this book is a star map of this area of the sky which will help him visualize the constellations, though the conventional figures of a man, a hare, etc., are not drawn in.) Since we know that Cadmus and Jason were the two heroes who sowed the serpent's teeth, and this serpent has prominent rows of teeth (notably not fangs, the emphasis instead being upon the rows), and the serpent is placed in the position of the star Sirius in this pictorial star map, we have evidence (if we accept the star-map interpretation) that the Greeks must have been conscious of the Egyptian pun whereby 'serpent's tooth' in hieroglyphics is a synonym for 'the Goddess Sirius'. The doves and the shrine with serpents are both elements of the oracle centres associated with the Sirius tradition in Greece.

Plate 20: The great hawk of Horus which stands before the temple of Edfu in Egypt. Similar statues would have stood at the Egyptian cemetery of Colchis and given rise to the Greek traditions of Circe ('hawk') through the spread of legends about the Argonauts and their search for the Golden Fleece at Colchis, which Herodotus tells us was an Egyptian colony.

Plate 21. The identification is found in the classical Encyclopaedia of Pauly-Wissowa under Proclus. The bust is in the Athens Museum, and may be found reproduced (though unidentified) in Gerhart Rodenwaldt Griechische Portrats. Rodenwaldt also reproduces photographs of front and side view of a bust later identified as being that of the earlier neo-platonist philosopher Iamblichus.

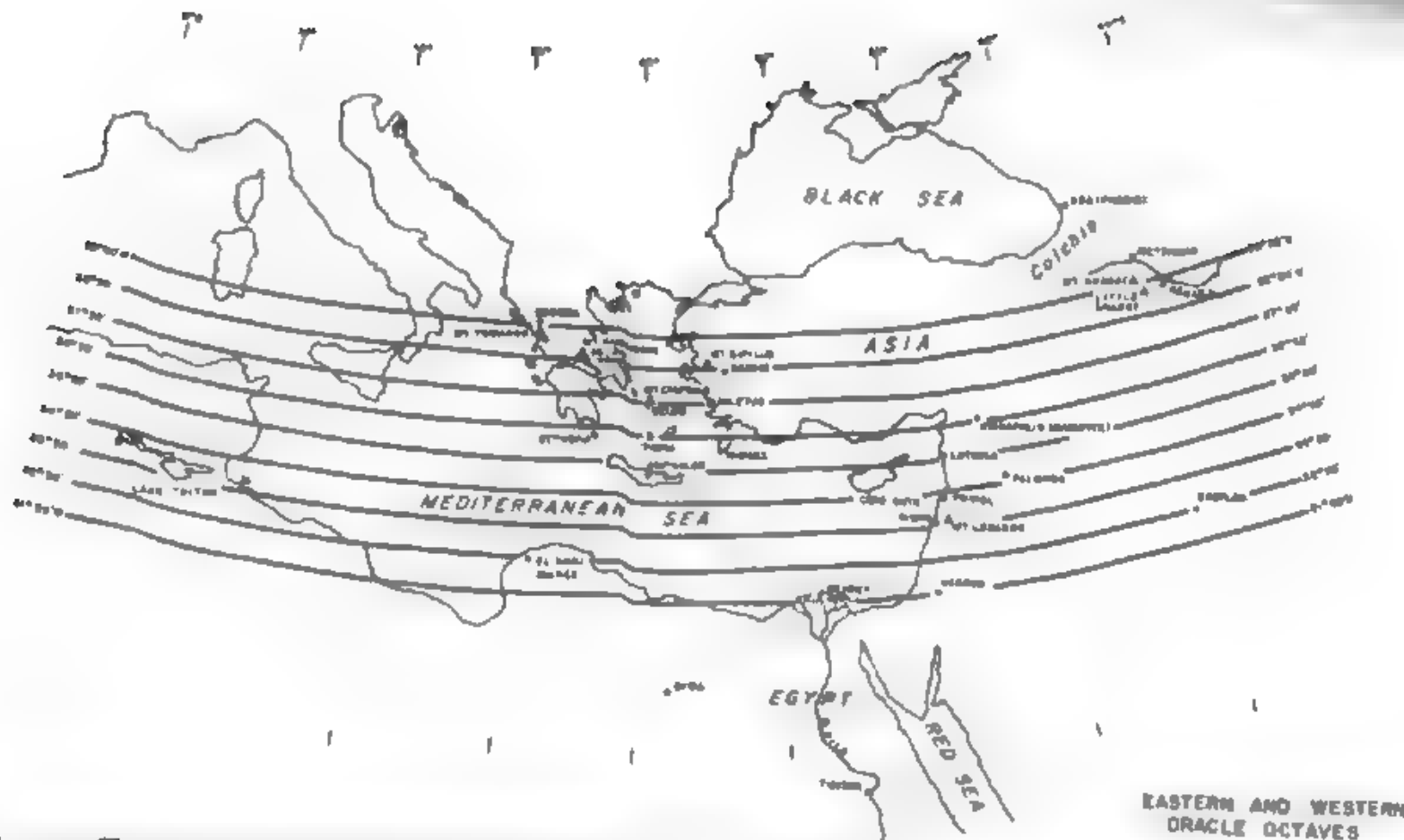


Figure 25. The latitudinal bands – such as those that criss-cross the omphalos stones (see Plate 12) – graphically demonstrate the oracle octaves descending from Dodona to Behdet and from Mount Ararat to Hebron.

It is also interesting to note, by way of relation with the ark of Noah, the ark of Ziusadra (or Utnapishtim), the ark of Deukalion, and the Argo – all of whom sent forth birds over the water (like those birds from Thebes as well) – that the standard Egyptian hieroglyph for the act of laying out of parallels and meridians is, as we have seen, two pigeons facing each other. Stecchini says: "In the religion of the Old Kingdom (of Egypt), Sokar is an important god of orientation and of cemeteries. The god and the geodetic point were represented by the stone object which the Greeks called omphalos, 'navel' – it is a hemisphere (the northern hemisphere) resting on a cylinder (the foundations of the cosmos). Usually on top of Sokar – as on top of any omphalos, there are portrayed two birds facing each other: in ancient iconography these two birds, usually doves,



are a standard symbol for the stretching of meridians and parallels'

Hence we see even further Egyptian connections with the Greek and Near Eastern tales in which the birds are let fly and the ship finds the oracle centre's mountain

Associated with oracle centres was probably also a tree-code' Dodona had its oak Dephi was associated with laurel And we learn from the Elegies of the sixth century b g poet Theognis (5-8) and from the Homeric Hymns that the oracle centre of Apollo at Delos was specifically associated with the palm tree Any site in the Lebanon, of course, such as Mt Lebanon and its possibly related centre of Sidon, would be associated with the famous cedars known to us also from the Epic of Gilgamesh as intimately connected with Gilgamesh's exploits at 'Cedar Mountain' in the Lebanon In putting together a schema of trees we are faced with considerable problems, but this is at least a beginning A great deal of information on tree alphabets is to be found in Robert Graves's books The Greek Myths<sup>41</sup> and even more so in his The White Goddess<sup>42</sup> The willow was associated with the Colchian cemetery and with the island of Aeaea of Circe, but particularly it is connected with the island of Crete in tradition But this subject will have to be tackled at some other time, lest I blow this book up into a puffball of miscellaneous odds and ends We do know from Robert Graves that the oracle centre of Hebron which is on the same latitude as Behdet and seems to be its eastern counterpart, was connected with the tree sant, or wild acacia, the sort with golden flowers and sharp thorns It is the oracular Burning Bush in which Jehovah appeared to Moses Graves adds 'The acacia is still a sacred tree in Arabia Deserta and anyone who even breaks off a twig is expected to die within the year'<sup>43</sup>

Its symbolism for the Sirius Mystery is an act of pure genius, and is graphically elucidated by Theophrastus<sup>44</sup> 'There are two kinds, the white and the black, the white is weak and easily decays, the black is stronger and less liable to decay' 'A perfect symbol of the two stars, the 'black' Sirius B being 'strong' for its size compared with the white Sirius A Also of the willow (fourth centres), Theophrastus tells us<sup>45</sup> 'There is that which is called the black willow and that which is called the white The black kind has boughs which are fairer and more serviceable There is a (dwarf) form

## THE ORACLE CENTRES

149

### CHART OF THE ORACLE OCTAVES

WESTERN CENTRE	EASTERN CENTRE	TREE-CODE	'PLANET'-CODE	DIVINE BEINGS
Δ. Dodona (Mt. Tomaros)	Μετσανορ (Mt. Ararat)	oak, phagus	Saturn?	Maskand born from stones (‘bones of Earth’)

					at Dodona
7	Delphi (Mt. Parnassus)	Sardis (Mt. Sipylus)	Laurel	Sun?	(Mankind born from stones at Delphi according to rival tradition)
6	Delos (Mt. Cynthus)	Miletus (Didyma, also known as Branchidae, its associated oracle centre, Mt. Latmus	palm	Mars (Artemis was born first, not Apollo)	Artemis (Diana, and Apollo born on Delos
5	a. Somewhere on north-east coast of Cythera? b. Rhodes? c. There on Island of Thera? (If so, destroyed by the volcano)	Hirrapolis (Bambyce)	?	Mars?	?
4	Omphalos (Therac) near Knossos on Crete	near Latakia?	willow (according to Pliny, a willow grew out of the Cretan cave where Zeus was born)	Jupiter	Zeus (Jupiter, was born on Crete
3	Somewhere on south coast of Cyprus? (associated with Paphos? Alzotri?) Cape Gata?	near Tripoli? Palmyra?	cypress (the word cypress is derived from Cyprus)	Venus	Aphrodite (Venus, born at Cyprus
2	Lake Tritonis (also known as Lake Triton) in Libya/Tunisia	Sidon (Mt. Lebanon)	cedar	Mercury? (as in Egyptian myths both 'cedar' and 'the planet Mercury')	Athena (Pallas born at Lake Tritonis
1	El Marj (Barce) Libya	Babylon	?	?	?
c.	Behdet	Hebron	wild acacia	Earth?	—

Note: At one degree of latitude north of Dodona and Azara is the mystery centre of the Cabezoni on the island of Samothrace.

.50

## Notes

### THE SIRIUS MYSTERY

1 Star Names, op. cit., p. 67

2. Lockyer, Sir Norman The Dawn of Astronomy, London, 1894 (Reprinted in the 1960s by MIT Press in U S A, introduction by Prof. de Santillana)

3 The Peoples of the Hills, Ancient Ararat and Caucasus, London, 1971 p. 226

4 Op. cit., p. 73

5 Allen, Star Names, op. cit. p. 73

6 See Note 2.

7 7 March 1974

8. A week later, on 14 March, a letter appeared in The Times from Brian Galpin claiming that his father Canon F. W. Galpin, had previously established the certain antiquity of the heptatonic diatonic scale in his book Music of the Sumerians, Babylonians, and Assyrians. Cambridge University Press, 1937. A month after this, on 15 April 1974, a letter appeared in The Times from Dr Crocker and Dr Kulmer themselves, in California, which was long and not particularly clear. It seemed to be trying to acknowledge Professor Gurney of Oxford for some assistance and condemning Canon Galpin for reaching his conclusions on a different basis from themselves. Crocker and Kulmer obviously aimed at clearing up some misunderstandings, but only succeeded in muddying the waters (at least the letter befuddled me).

9 The Greek Myths, 21, 10

.10 Ibid. 170-3

.11 Higgins, Godfrey The Anacalypsis, New York, 1927, Vol. I, Book III, Chapter 2, Section 4

.12 According to the Dogon 'Sirius is the navel of the world' See Le Renard Pale, pp. 324-5

.13 Op. cit.

.14 Parke, H. W. Greek Oracles, Hutchinson (paperback), London, 1967 p. 38

.15 Ibid., p. 32

.16 Ibid., pp. 33-4

.7 Ibid., pp 94-5

.8 Ibid., p. 94.

.9 I refer the reader who suffers from a desperate urge to purge his ignorance to that magnificent work by Sir Norman Lockyer *The Dawn of Astronomy*. His book should be required reading in all schools, even though it becomes quite technical in places (which the non-technical reader is well advised to skim over quickly). This book was published in 1894 in London by Cassell, but at the instigation of Professor Santillana, has been brought out again by MIT Press in America in the 1960s (see Note 2).

Of course another excellent, perhaps essential, book on the subject is Santillana and von Dechend's *Hamlet's Mill* (see ch. 3, n. 11). Though it is a long book, the authors admit it amounts only to a preliminary essay, and it is a good deal more confusing to read than it should be. In fact, the authors have frankly let their material overwhelm them but they were coping with material on a far grander scale than Lockyer, and it was like trying to hold back a tidal wave. They have opened up an entirely new field for modern scholars and they may wear the badge of the pioneer and perhaps the pioneer's smile as well.

20 *Hamlet's Mill*, op. cit., p. 286.

21 Tompkins, Peter *Secrets of the Great Pyramid*, Harper and Row, New York, London, 1971  
Appendix by Livio Stecchini

22 Parke, op. cit., p. 95

23 Livio Stecchini mentions a number of Greek accounts which associate Delphi with Sardis, the capital of the kingdom of Lydia in Asia Minor which is on the same parallel (38 deg. 28' north), p. 349 (Stecchini's Appendix) in Tompkins, op. cit. I believe that the mountain associated with this geodetic centre is Mount Sipylus, north-east of Smyrna (now Izmir). See Pausanias III, xxii 4 and p. 13 of Garstang, John, *The Syrian Goddess*, London, 1913. Mt. Sipylus boasts an extremely ancient gigantic carving from the living rock of the Great Goddess whose main centre came to be Hierapolis, another oracle centre in the series. The Great Goddess as Gaia (to the Greeks) was the original patroness of Delphi before the usurpation by Apollo ('... the earth-goddess was the original female deity ... in Late Mycenaean times ... there may have been an oracle as part of the cult ... the arrival of Apollo as a god of divination was originally a hostile intrusion ...', p. 36, Parke, op. cit.). I believe that Malatya (Malatya), further inland than Sardis on the same parallel, may be

## THE ORACLE CENTRES

151

connected somehow with Delphi and Sardis as well (obviously more with Sardis than Delphi). For this, see Garstang, pp. 14-15.

24 See Notes 20 and 22

25 See also Appendix IV

26 It is such a mesh to which the Dogon presumably refer when they speak of 'the basket which is not a basket' See *A Sudanese Sirius System* by Griaule and Dieterlen in this book

27 Tompkins, op cit , p. 182

28 Ibid., p. 298

29 Herodotus. *The Histories*, Penguin paperback, London, 1971 p. 124. (Textual reference Book II, 54-9 )

30 Hume, David. *The History of England*, Porter and Coates, Philadelphia, undated (nineteenth century), 5 vols p. 57 Vol V (end of Chapter 62) See also John Aubrey, *Brief Lives*, entry for William Harvey; Hume got much of this from Aubrey (Hume is not always to be trusted, he does misrepresent General Monk's motives shamelessly despite Aubrey's explicit account. Perhaps the reader uninterested in seventeenth-century English history will forgive this aside )

31 See Note 28 The famous oracle of Ammon in Libya, visited by Alexander the Great following his conquest of Egypt (if a fruit falling on one's head is a conquest) was at the Oasis of Siwa, where some ruins are still preserved. Also see maps in this book,

32 Tompkins, op cit , p. 181

33 Pritchard, op. cit , p. 44 ff (Scholarly references, including Jacobsen, on p. 45,)

34 Kramer, S. N. *History Begins at Sumer* (originally entitled *From the Tablets of Sumer*, 1956, before revision), Doubleday Anchor Book (paperback), New York, 1959

35 Garstang, op cit (see Note 22) Garstang's book contains a translation of Lucian's *De Dea Syria* concerning the Great Goddess at Hierapolis

36 See Note 32

37 Tompkins, op cit , p. 336.

38 Ibid., p. 349

39 Ibid., p. 346

40 See Note 20

41 Op cit

42 Graves, Robert. *The White Goddess, A Historical Grammar of Poetic Myth*, Vintage paperback, New York, undated (originaly copyright 1948 by Graves)

43 Ibid. See pages listed under acacia in index. (I leave this to the reader because my edition

of this book is undated and will probably not match the reader's in pagination.)

44 Theophrastus, Enquiry into Plants, Book IV, ii 8, trans. by A. F. Hort, Loeb Classical Library, William Heinemann Ltd., London, and Harvard University Press, U.S.A., 2 vols (This ref. vol. I, p. 299) Theophrastus was the father of botany, and succeeded his friend Aristotle as Head of the Peripatetic School at the Lyceum in Athens. He lived 370-c. 285 B.C. and at the peak of his teaching career actually had 2000 students.

45 Ibid. Book III xiii, 7 (Vol. I, p. 249)

## SUMMARY

The other Arabian star named 'Weight' was in the constellation Argo. But we see the Argo was associated with Sirius, as well as was the first star named 'Weight' which was in the Great Dog constellation and a visible companion of Sirius.

If an Argo is projected on the globe with its rudder near the ancient Egyptian city Canopus on the coast of the Mediterranean (the star Canopus forms the rudder of the Argo in the sky) and with its prow at Dodona (from where the oak came which was placed in the Argo's prow), if we hold the stern firmly on Canopus but swing the ship eastwards at the top, so that the prow points towards Mount Ararat, where Noah's ark was supposed to have landed, we find that the arc thus described is a right-angle of 90°.

Instead of Canopus we must really use the neighbouring site of the now entirely

vanished city of Behdet, which was the capital of pre-dynastic Egypt prior to the foundation of Memphis.

Dodona is exactly 8° of latitude north of Behdet. Delphi is exactly 7 deg. north of Behdet. Delos (another important early oracle centre, vanished by classical Greek times) is exactly 6 deg. north of Behdet. Behdet was the Greenwich of the ancient world prior to 3200 B.C. and was used as a geodetic headquarters.

Associated with near-by Mount Ararat as a mystery centre was the now little-known site of Metsamor. Mt. Ararat is 8 deg. north of Behdet and on the same parallel as Dodona.

A site on Kythera is known to have connections with early dynastic Egypt as a religious centre and is about 5 deg. north of Behdet. The island of Thera may, however, have been an oracle centre. It was destroyed by a famous volcanic eruption in Minoan times.

All these sites were revealed as a pattern now termed a 'geodetic octave' by the projection on the globe of the Argo, which is connected with Sirius. Sirius was not only the element of the most sacred traditions of the Dogon and the ancient Egyptians, but apparently of the entire civilized and cosmopolitan Mediterranean world prior at least

to 3000 b.c. and probably well before 3200 b.c.

The amphibious creature Oannes, who brought civilization to the Sumerians, is sometimes equated with the god Enki (Ea) who ruled the star Canopus of the Argo. Enki is a god who sleeps at the bottom of a watery abyss, reminiscent of Oannes who retired to the sea at night. Enki is also the god responsible for the ark in those early tales of the Sumerians and Babylonians from which the Biblical ark and deluge story was derived.

The 'Greek ark' was claimed to have landed at both Dodona and Delphi. An 'ark' was carried in procession at Delphi.

At Delphi and at Delos are surviving omphalos ('navel') stones. Omphalos near Knossos in Crete is 4 deg. north of Behdet. We know from the Homeric Hymn to Apollo that Minoans (before 1200 b.c.) 'from Knossos took Apollo to Delphi'.

The Egyptian Pharaoh Akhenaten's reform was really at least partially a geodetic one explaining the move of his capital city. He may have wished to return to the 'pure' system of pre-dynastic times.

Herodotus tells us that Dodona (according to its priestesses, whom he knew) was founded from Egypt—specifically Egyptian Thebes. Thebes is equidistant from both Dodona, where the Greek ark landed, and Mount Ararat, where the Hebrew ark landed. The three points, when joined, form an equilateral triangle on the globe. Also according to Herodotus, the Oasis of Siwa, with its oracle of Ammon, was founded from Thebes. This oasis centre and Thebes are both equidistant from Behdet. Geodetic surveys of immense accuracy were thus practised in ancient Egypt with a knowledge of the Earth as a spherical body in space and projections upon it envisaged as part of the institutions embodying Sirius lore for posterity.

## CHAPTER SIX

### Origins of the Dogon

We shall now return to Hercules and the number fifty. A connection between them arises in Pausanias, Book IX (27, 5), when Pausanias is discussing a city in Boeotia, which is the region where Orchomenos is. The city is called Thespias 'below Mount Helikon', as he says. He continues:

They have a sanctuary of Herakles [Hercules] where a virgin priestess serves until she dies. They say this is because Herakles slept with all the fifty daughters of Thestios in the same night, except for one. She alone refused to mate with him. Thinking she was insulting him he sentenced her to be his virgin priestess all her life. I have also heard another legend about it: that Herakles went through all Thestios's virgin daughters on the same night and they all bore him male children, but the youngest and the eldest bore him twins. But I am quite unable to believe that other story, that Herakles could behave so arrogantly to the daughter of a friend. Besides, even when

he was on earth he used to punish arrogant outrages, particularly if they were against religion so? he would hardly have founded his own temple and set it up with a priestess like a god. But in fact this sanctuary seemed to me older than the days of Herakles son of Amphitryon, and to belong to the Idaian Daktylos called Herakles, whose sanctuaries I also discovered at Erythrai in Ionia and at Tyre. Actually even the Boiotians knew the name, since they say themselves that the sanctuary of Mykalessian Demeter has Idaian Herakles as patron.

Levi adds in a footnote that the sanctuary at Tyre is mentioned by Herodotus (2, 45) and gives other references as well .

To return to the amorous labour of Hercules I hope it will be noted that Pausanias had here elucidated a Middle-Eastern connection for this tale with the important city of Tyre, the site of which is off the coast of present-day Lebanon. Here, at least, we have a bit of evidence from ancient times bearing direct witness to the connections between these endless curious traditions in Greece about the fifty and their Middle-Eastern counterparts, or at least Middle-Eastern locale

It would now be worth while for us to see what Robert Graves has to say about this tale. Graves calls Thespios by the name of Thespius and spends some time pondering the meaning.<sup>2</sup> He says it means 'divinely sounding', but wishes he could find another meaning. I am inclined to be happy with 'divinely sounding' because of what I believe to be the heavy emphasis on music, sound and

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.54

## THE SIRIUS MYSTERY

harmony among the ancients. The Greeks were reputed, for instance, to have considered music the highest art, and the Pythagoreans made harmony and number into an actual religion. We have already come across the use of the octave as a relevant theme in our considerations and we have seen the possible connection of omphalos and om – the latter being the Indo-Aryan sacred syllable chanted for its 'divinely sounding' qualities and surviving in Christianity and Islam as Amen. Since if we were to look for a Greek word to describe the sacred syllable om we could choose the appropriate name meaning 'divinely sounding', it seems that this meaning is by no means unsatisfactory. Graves tells us the following.<sup>3</sup>

King Thespius had fifty daughters by his wife Megamede [mega-medea?] daughter of Arneus, as gay as any in Thespiæ. Fearing that they might make unsuitable matches, he determined that every one of them should have a child by Herakles [Hercules] who was now engaged all day in hunting the lion, for Heracles lodged at Thespiæ for fifty nights running



[Notice fifty applied here as a succession of days days, months, years They can become blurred as long as fifty remains ] You may have my eldest daughter Procris as your bedfellow, Thespius told him hospitably But each night another of his daughters visited Heracles, until he had lain with every one Some say, however, that he enjoyed them all in a single night

It is interesting to note that the name Procris of the eldest daughter means 'chosen first' Prokrossoi, which is a closely related form of the same stem means, 'ranged at regular intervals like steps' Now what could be a more obvious name for the eldest daughter than one with such overtones and significance if it were clearly intended, as it obviously was, to emphasize that the daughters were not meant to be thought of as individuals but as successive expressions of fifty successive periods of time in this case, twenty-four hour periods, or days ? But the intention obviously was to highlight the sequence of fifty time periods, personified as daughters enjoyed by our ubiquitous Hercules who is connected in so many ways with the Sirius complex

Graves adds 4 'Thespius's fifty daughters like the fifty Danaids, Pallantids, and Nereids, or the fifty maidens with whom the Celtic god Bran (Phoroneus) lay in a single night must have been a college of priestesses serving the Moon goddess, to whom the lion-pelted sacred king had access once a year during their erotic orgies around the stone phallus called Eros ('erotic desire') Their number corresponded with the lunations which fell between one Olympic Festival and the next

Here is Graves's irrepressible moon goddess and here are her lunations She carries them about with her wherever she goes But unfortunately Graves's brave attempt to find a lunar rationale for the fifty is not sufficient The Olympic Games were, as they are now held every four years, and the Olympiads or four year periods were understood to have commenced in 776 B C , which is an extremely recent date compared with the extreme antiquity of 'the fifty' in all its myriad occurrences For instance, there were no Olympiads in Homer's day when 'the tale of the Argo was on everybody's lips', and the fifty Mnyae were on their way into literary immortality in what was to become the Western world Much more likely that a period of fifty lunations was modelled

## ORIGINS OF THE DOGON

155

after a long-established tradition the esoteric fifty year period. Thus the fifty month and fifty day sequences were probably derived in emulation

I assume that the cycle of fifty lunations which Graves mentions here is identical to his fifty-month period of the reign of a sacred king, which is supposed to be half of a Great Year of a hundred months Can it be that fifty as half of one hundred, is meant to represent by its reduplication the two-to-one ratio as a means of signifying the concept of the musical octave with its two-to-one ratio?\*

And can this be why the Argo is supposed to be 'whole in the sky' (Aratos) and yet the constellation also supposed to represent only the latter half of a ship? Can this apparent double-talk be yet another way of signifying the two-to-one ratio?

It also seems significant that each fifty-month period is carefully specified to constitute one reign, even though it is only half of 'the Great Year'. Can 'one reign' be analogous to 'one orbit' and the 'Great Year' of two orbits be contrived to communicate the two-to-one harmonic ratio of the octave?

Another occurrence of fifty and a hundred together is with the three monsters born to Uranus the sky and Gaia the earth. Their names were Gorgon, Briareus, and Gyges. "From their shoulders sprang a hundred invincible arms and above these powerful limbs rose fifty heads attached to their backs." For this reason they were called the Hecatoncheires or the Centimanus, as we are reliably told.<sup>5</sup>

These monsters resemble the monster Cerberus, the hound of Hades who originally had fifty heads, but later became simplified and had only three heads — presumably for the same reason that these monsters are three in number, and also the reason that Hecate (whose pet Cerberus was, and who was a form of Isis-Sirius and whose name literally means 'one hundred') had three heads or forms, and that the boat of Sirius in ancient Egypt had three goddesses together in it. In other words, probably the same reason that the Dogon insist that there are three stars in the Sirius system (Despite the fact that the astronomical evidence has recently gone against the existence of a third star — the case is by no means closed. If there is a third star, it does not produce the perturbation which had been claimed for it before the seven years' observations recently concluded by astronomer Irving Lindenblad.<sup>6</sup>)

We will recall that originally Hercules is supposed to have led the expedition of the Argo. In the version of Apollonius Rhodius he accompanies the expedition. Well, in Graves we may read of another traditional exploit of Hercules in the Black Sea.<sup>7</sup> He went 'in search of Hippolyte's girdle in the Black Sea' and 'the girdle belonged to a daughter of Briareus ("strong"), one of the Hundred-handed Ones', who was of course a fifty-headed one as well. And note his name 'Strong'. The word (briaros) means 'strong', and another form is (briarotes) which means 'strength, might' and a related form (brithos) means 'weight', and (brithosyne) means 'weight, heaviness'. Where have we encountered this idea before?

We should note that Hippolyte means simply 'letting horses loose'. And it

\* The frequency of a note is doubled when it is raised an octave — hence a ratio of 2 to 1. This may be demonstrated visually on a single string and does not require the modern measurements of frequency.

was from Colchis that the horses of the sun were let loose every morning for it was there that they were stabled, according to Greek tradition. There is also a really peculiar use of the word hippopede, which has the normal mundane meaning of 'a horse fetter', in a cosmic sense. It appears from Liddell and Scott that this word was used by the astronomer Eudoxus (the one who went to Egypt and who was mentioned earlier) as the word for the curve described by a planet. We know this from Simplicius on Aristotle's *De Caelo* and Proclus on *Euclid*. \* Two sources are better than one. There is probably more to this than we can ever discover for the necessary texts are lost.

If we examine the name Gyges, who was one of the other three monsters which included Briareus, we find its meaning has the same origins as *gyganteios*, which in English became 'gigantic', but the meaning of this word was not by any means simply 'giant'. Graves gives Gyges the meaning of 'earth-born', another concept we have come to expect in connection with our Sirius-complex of myths. Just as the stones Deukalion and his wife Pyrrha threw over their shoulders had been torn from their mother earth, Gaia, and were her bones turning into men to repopulate the earth after the flood and the voyage of the Greek ark, and just as Jason and also Cadmus sowed the teeth and they sprang up as 'earth-born men', so we find that Gyges is also 'earth-born'.

And just as Gilgamesh sought strength from the earth when 'his teeth shook in the earth, so we discover that *gygas* means 'mighty' or 'strong', and is also used in Hesiod to refer to the sons of Gaia (Earth), which is as specific as we could wish, for it gives an undeniable and conscious connection between 'the children of Gaia of Deukalion', 'the offspring of Gaia' of the Colchian teeth, and 'the sons of Gaia' who were a race of giants, and Gyges, whose mother was Gaia.

And we are not to forget that Gyges, like Briareus, can mean 'strength' and 'might', though with the particular shade of meaning added that it is strength and might drawn from the earth, which could be one way of describing a super-dense body of degenerate matter. After all, super-dense matter is 'strong earth'. We must also remember that Gyges has fifty heads.

As for the name Cottus, the third of the three monsters, Graves tells us that it is not Greek. Graves says (3, 1) 'Cottus was the eponymous [name-giving] ancestor of the Cottians who worshipped the orgiastic Cotytto, and spread her worship from Thrace throughout North western Europe. These tribes are described as "hundred-handed", perhaps because their priestesses were organized in colleges of fifty, like the Danaids and Nereids, perhaps because the men were organized in war-bands of one hundred, like the early Romans.

The Cottians might possibly derive their name from an Egyptian word



Perhaps it was which means 'oarsmen' and has been applied to

'divine oarsmen' With a different determinative and when not applied to a man, the word means 'orbit', 'revolution', 'to go around'. And the word in Egyptian was also applied to a group of specific people in a specific region. The Qetu were the natives of Qetu, which Wallis Budge says was 'The Circle' that is,

\*Simplicius and Proclus are despised by the orthodox mentalities because they were neoplatonists. See Appendix One 8

## ORIGINS OF THE DOGON

157

'the North Syrian coast about the Gulf of Issus and the deserts between the Euphrates and the Mediterranean'

There was also an Egyptian precedent for applying the same name to a god. Qetu is 'a god of the abyss' and a reduplicated version of the name which repeats the 'T' as Cotytto does is Qetqet, who is significantly one of the thirty-six decans. In addition, Qetshu 'refers specifically to 'the "nude" or Syrian goddess' \* which seems clearly to be an orgiastic element, for Graves says that Cotytto was an orgiastic goddess. It seems fairly clear, then, that Cottus is of Egyptian origin and originally applies to the orbit of Sirius B and in the Egyptian era the particular term came to be associated with a people of Syria who moved to Thrace, and even in Egyptian times the name had all its applications to a foreign people, a foreign orgiastic goddess, and Sirius-related concepts including both oarsmen and an orbit, two ideas which I have frequently connected before. Here in Egyptian we find an orbit called by a name which applies equally well to divine oarsmen. And the word survives in the fifty-headed Cottus' Fifty oarsmen, fifty years in the orbit, fifty heads to the Sirius-monster. How simple, how elegant.

I am indebted to my friend Michael Scott, who once rowed at Oxford, for the fine suggestion that there could hardly be a better analogy of any symbol with its intended meaning of 'a specific interval both of space and time' than the oar-stroke. Rowing is a precisely paced discipline when practised in earnest, as it would certainly have been in ancient times when it was one of the two principal means of navigation at sea, and the only reliable one if the winds failed, as they so often did. It also represents a self-reliance which illustrates the self-impelled motion of a body in space which is orbiting (or what seems to be self-impelled).

I should point out here that the earliest name for the figure known to us as Hercules was, according to Robert Graves in *The Greek Myths* (1932), none other than Briareus. And we also have learned that the earliest form of Jason was Hercules (whose earliest form was Briareus). We thus find that Briareus,

with his fifty heads, was the earliest captain of the fifty-oared Argo. Briareus, whose name means 'weight' And whose brother's name means both 'oarsman' and 'orbit'

Apart from the three monsters each with fifty heads, Gaia also gave birth to Garamas, who was not only earth-born, but who 'rose from the plain like the earth-born men of Colchis'. Graves says 'The Libyans, however claim that Garamas was born before the Hundred-handed Ones and that, when he rose from the plain, he offered Mother Earth (Gaia) a sacrifice of the sweet acorn'. The acorn of the oak – the oaks being representative of Dodona, of the piece of the Argo's prow – and of the Colchian grove.

It is in the footnote of Graves.0 that we learn something of really immense significance to us: 'Garamas is the eponymous ancestor of the Libyan Garamantians who occupied the Oasis of Djado [sic], south of the Fezzan, and were conquered by the Roman General Babus in 19 b.c. They are said to have been

\* The great goddess of Hierapolis (one of the oracle centres) must be intended by this 'Syrian goddess'. See note 34 to Chapter 5 – reference to Lucian's *De Dea Syria*, and Garstang – also see Bibliography.

## THE SIRIUS MYSTERY

of Cushite-Berber stock, and in the second century a.d. were subdued by the matrilineal Lemta Berbers. Later they fused with the Negro aborigines on the south bank of the Upper Niger – and adopted their language. They survive today in a single village under the name of Koromantse.

I need hardly point out to the alert reader that the southern bank of the Upper Niger is the home of the Dogon! What should be investigated on the spot is the relations which subsist between this sad shaggy remnant of the Garamantians and the surrounding Dogon and other tribes. Also, the villagers of Koromantse might be discovered to possess the Sirius lore themselves.

On the most detailed French map of this area there is a village called Korienze only sixty miles from Bandiagara and in the heart of Dogon country. It is on the south bank of the Upper Niger and is presumably the place Graves means.

In line with this important discovery I should point out that Herodotus says in Book Two (103 and 106) – It is undoubtedly a fact that the Colchians are of Egyptian descent – the Colchians, the Egyptians, and the Ethiopians are the only races which from ancient times have practised circumcision. The Phoenicians and the Syrians of Palestine themselves admit that they adopted the practice from Egypt, and the Syrians who live near the rivers Thermodon and Parthenius, as well as their neighbours the Macronians, say that they learnt

it only a short time ago from the Golchians. No other nations use circumcision, and all these are without doubt following the Egyptian lead.'

Circumcision is fundamental to Dogon culture and forms the central part of the ritual of the Sigui which the Dogon hold every sixty years and though I have pointed all this out earlier, it does no harm to repeat it.

We shall recall if we read the Argonautica that the Argonauts were blown off course to Libya, where they were stranded for some time. In his book *Herodotean Inquiries*<sup>11</sup> Seth Benardete speaks of the Garamantes to whom he gives an alternative name, the Gamphasantes. They are described in Herodotus, Book Four (after 178) as inhabitants of 'Further inland to the southward, in the part of Libya where wild beasts are found'. At 179 Herodotus connects Jason and the Argonauts' visit to Libya with the eventual foundation in Libya 'of a hundred Grecian cities'. Benardete's comments in his book connect the Argos' visit to Libya and the Libyan city of Cyrene:

Herodotus first indicates how closely Libya, Egypt, Scythia, and Greece are joined. The ancestors of Cyrene's founders were descendants of Jason's companions, who sailed to Colchis, originally an Egyptian colony on the eastern shore of the Black Sea, and the third generation from these Argonauts were expelled from Lemnos by the very same Pelasgians who later abducted Athenian women from Brauron, where a cult of Artemis-Iphigeneia was practised, just as among the Taurians in the Crimea, and Jason is said to have been carried off course to Libya. Cyrene is the melting-pot of Egyptian, Libyan, and Scythian things. Its founding suggests the Scythian account of their origins. They said that golden objects fell from heaven, which flashed fire when the two older brothers of Kolaxais approached them, but Kolaxais himself was able to take them home. To these celestial [*sic*: poemata] there here correspond the oracular

## ORIGINS OF THE DOGON

159

verses of Delphi which, in both the Theban and Cyrenae versions, prompted the sending of a colony to Libya.

Robert Graves got his information<sup>12</sup> on the Garamantians going to the Upper Niger by way of Libya from a series of books by Eva Meyrowitz, an anthropologist who spent many years studying the Akan tribe of Ghana, directly south of the Dogon.<sup>13</sup> Graves paraphrases her books: 'The Akan people result from an ancient southward emigration of Libyo-Berbers—cousins to the pre-Hellenic population of Greece—from the Sahara desert oases (see 3-3) and their intermarriage at Timbuctoo with Niger River Negroes.' Timbuctoo—or Timbuktu—is the nearest big city to the Dogon. Graves continues: 'In the eleventh century A.D. they moved still further south to what is now Ghana.' I might point out that the path of migration from Timbuctoo to Ghana goes straight through

the country of the Dogon, whose territory is directly south of Timbuctoo. So it is quite clear by now that peoples intimately connected with the Sirius tradition came from Greece to Libya and thence south to the Libyan oases of the Sahara, thence further south-west past the Sahara to Timbuctoo and the region of the Dogon where they mingled with Negroes of the Dogon region and took their local language for themselves, eventually becoming indistinguishable from the local African population in appearance and speech, but retaining their old traditions as their most secret doctrines. The migration route is shown in Figure 27.14.

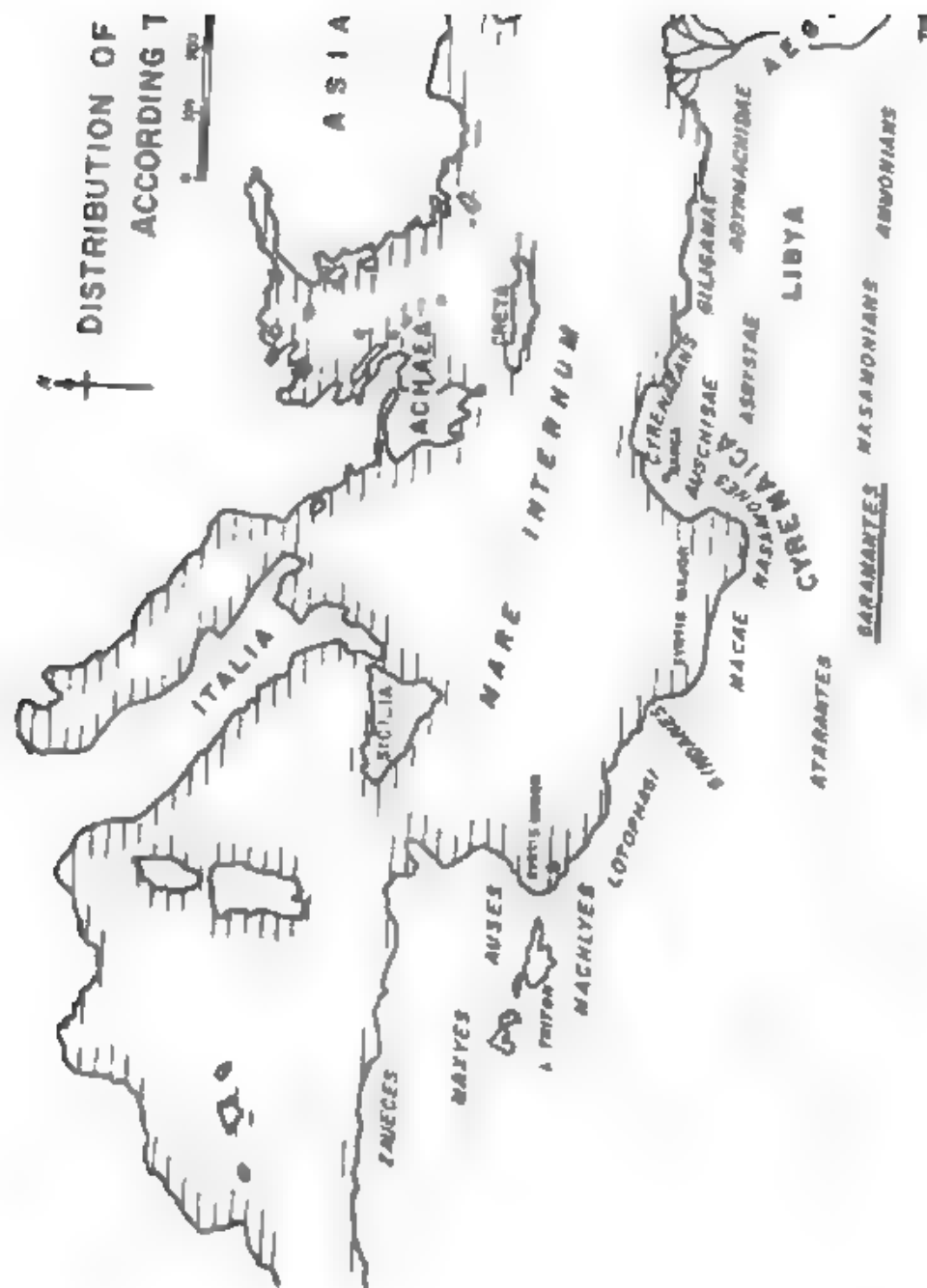
There is something incredible in the survival of the Argonauts in the obscure reaches of the French Sudan! In fact, these people, which I assume must include the Dogon as well as their immediate southern neighbours (and the Dogon sell onions to Ghana as part of their livelihood), seem to be direct descendants of Lemnian Greeks who claimed to be the grandsons of the actual Argonauts! It almost seems too amazing to be true, that we should have begun this book by considering a strange African tribe, then considered similar Sirius traditions in the Mediterranean stemming from ancient Egypt, and then be led back again to the African tribe whom we discover to be directly descended from the Mediterranean peoples privy to the Sirius complex!

Later I shall mention a bit more about the Pelasgians, who lived in Arcadia and, so Herodotus informs us, were not conquered by the Dorian invaders of Greece in pre-classical times. They have been among the main continuers of the Sirius tradition as, apparently, have the people they displaced by force. But I mention them now to give more relevant information for this Libyan connection. Graves says, 15 'According to the Pelasgians, the goddess Athene was born beside Lake Tritonis in Libya', and Plato identified Athene, patroness of Athens, with the Libyan goddess Neith. Neith had a temple at Sais (in Egypt), where Solon was treated well merely because he was an Athenian.

Herodotus writes (IV, 189) "Athene's garments and aegis were borrowed by the Greeks from the Libyan women." Ethiopian girls still wear this costume. Herodotus adds here that the loud cries of triumph, ohulu, o.o.hu. uttered in honour of Athene above (Iliad, vi. 297-301) were of Libyan origin. Tritone means "the third queen." Again the reference to the three goddesses. And recall that in Libya was the shrine of Ammon equivalent to the Dodona oracle of Zeus, where the other of the two birds flew from Egyptian Thebes.

LIBYAN TRIBES  
O HERODOTUS  
PO 181 17







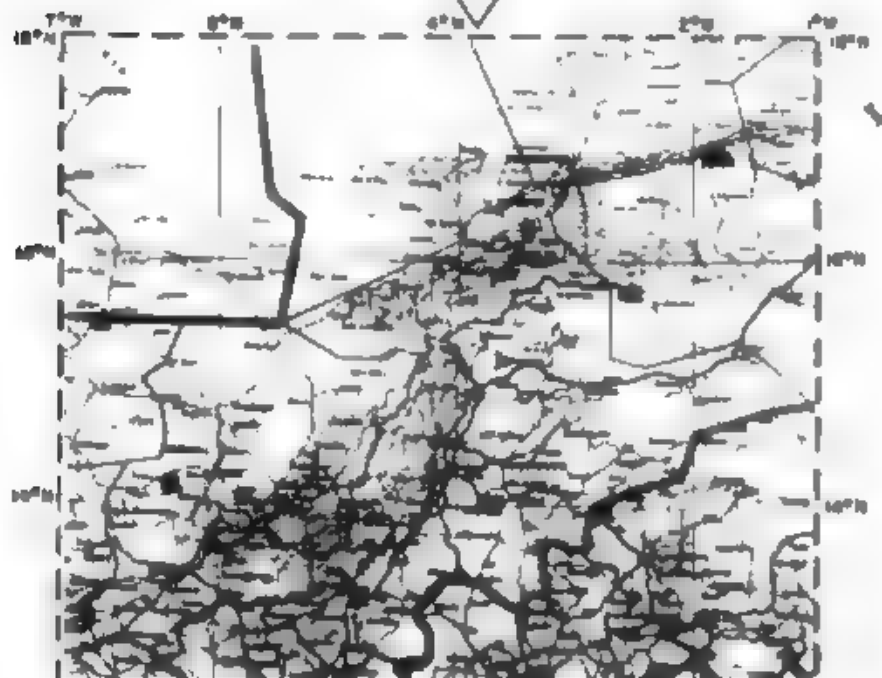




Figure 27. Migration route of the Dogon

.62

## THE SIRIUS MYSTERY

And Athene, the daughter of Zeus, is equivalently the daughter of Ammon who is identified with Zeus.

Athene was also known as Pallas Athene, for reasons given in Graves. He adds that 'the third Pallas' was father of 'the fifty Pallantids, Theseus's enemies (see 97 g and 99 a) who seem to have been originally fighting priestesses of Athene'. Once again the fifty

Graves gives some interesting information. 16 Tottery finds suggest a Libyan immigration into Crete as early as 4000 B.C., and a large number of goddess-worshipping Libyan refugees from the Western Delta seem to have arrived there when Upper and Lower Egypt were forcibly united under the First Dynasty about the year 3000 B.C. The First Minoan Age began soon afterwards, and Cretan culture spread to Thrace and Early Helladic Greece.

While again on the subject of the fifty, I want to note more information concerning Cerberus, the fifty-headed hound of Hades. Graves says 17 Echidne bore a dreadful brood to Typhon, namely, Cerberus, etc. Recall that Typhon was identified with Python 18 in the Homeric Hymn to Apollo and elsewhere, Python was the particular monster, slain by Apollo according to legend, whose rotting corpse lay directly under the oracle of Delphi.

Graves continues. 19 'Cerberus, associated by the Dorians with the dog-headed Egyptian god Anubis who conducted souls to the Underworld, seems to have originally been the Death-goddess Hecate, or Hecabe; she was portrayed as a bitch because dogs eat corpse flesh and howl at the moon. Orthrus, who fathered [various creatures] on Echidne was Sirius, the Dog star which inaugurated the Athenian New Year. He had two heads, like Janus, because the reformed year at Athens had two seasons, not three. The three heads of Hecate, of Cerberus in his simplified form, etc., possibly all represent the old, original year which had three seasons and originated in Egypt with the three seasons of their (1) inundation, (2) sowing, (3) harvesting, which were traditional there. But it seems unlikely. For why would the three goddesses sail in their Sirius boat in Egyptian representations which have absolutely nothing to do with a calendar? In short, the three goddesses and the three-headedness always to do with Sirius are not calendrical at all. But by the

extremely late times of Athens, calendrical explanations may have become fashionable for what could not otherwise be explained

In the above passages I hope the reader will note the specific information that connects Anubis (which much earlier I identified on altogether separate grounds with the orbit of Sirius B) with the Greek version of Anubis, Cerberus, with his fifty heads. In the Egyptian tradition I hadn't found any specific connection between Anubis and fifty. It is true that we have found the Egyptian word *qet* means both 'oarsman' and 'orbit', and as there were always fifty oarsmen in the Sirius-related boats, both in Greek and Sumerian saga, we were on our way to an identification on solid grounds. But here at last a specific connection has come to light, and would seem to be a splendid confirmation of my identification! And furthermore, we see that the dog Orthrus who was the brother of Cerberus, was specifically identified with Sirius. We thus have found in the Mediterranean world all the elements of the description of the Sirius system which were possessed by the Dogon. And we have also traced the Mediterranean Sirius lore to the Dogon by way of Libya, then the Saharan

## ORIGINS OF THE DOGON

163

oases, then Timbuktu, and finally the south bank of the Upper Niger and the Dogon region. Thus, through thousands of miles and thousands of years, we have discovered the source of that strange tradition still intact among a tribe deep in 'darkest Africa'. But there is more to be learnt. We must examine the Mediterranean tradition more closely, and particularly its oldest Egyptian origins in the shadowy pre-dynastic world of Behdet (which seems not to have been excavated and has presumably been lost in the mud of the Nile delta)

The father of Orthrus the Sirius-dog and his brother Cerberus the fifty-headed dog was the monster Typhon whom we mentioned a moment ago. And it is worth while for us to see what Liddell and Scott's Greek Lexicon has to say about the meaning of the name Typhon and also related forms of this word.

One meaning of ~~Typhon~~ (Typhon), curiously enough, is 'a kind of comet' -

in other words, a moving star! Another form is either Typhoeus or Typhos and specifically refers to the youngest son of Gaia, who was mother also of the three fifty-headed monsters and of Garamas. Typhos means 'smoke, vapour', and also conceit, vanity (because it clouds or darkens a man's intellect). Typhlos means 'blind' and specifically 'in the sense of misty, darkened'. The verb Typhloo means 'to blind, make blind' or 'to blind, baffle'. It also means 'to wrap in smoke'.

Since Typhon is specifically said to be the father of Sirius (Orthrus) and one of its unexplained definitions is a description of a moving star, and its son has fifty heads, I take all the references to obscurity and invisibility to mean that Typhon represents Sirius B which is the dark companion of Sirius and is invisible to us. In other words, we are typhlos (blind) to Typhon because

it seems as if it were obscured or typhloo'd by typhos (vapour smoke), and we are baffled, blind (typhlos) in the sense of the subject being darkened (typh.oo)

A possible origin of the word Typhon may be the Egyptian word tephut or teph-t, both of which have the meaning of cave, cavern, hole in the ground. This Egyptian word describes perfectly the chasm at Delphi in which Python was supposed to lie rotting, his corpse giving off the fumes out of the earth. And, as we have seen, Python was equated with Typhon in early times.

If we take the Egyptian word Up we discover that it means mouth and in the form tep-ra it means mouth of the god. Literally, but in fact the real meaning of this is 'divine oracle'. Tep is an unaspirated teph. Hence the Up of Delphi has a tephut, or cavernous abyss beneath it. Later I shall consider the Egyptian word Up in its further ramifications. But for the moment it is sufficient to see that Typhon almost certainly originates from the Egyptian word describing a cavern or hole in the earth, as the Egyptians founded the tep or oracle at Delphi and naturally used their own word to describe the cavern. As Delphi passed into Greek culture and the Egyptians became forgotten in all but vague legends such as the famous visit of the Canopic Heracles to Delphi etc., the original word to describe Delphi's cavern would have been retained through the natural conservative inclinations of religious organizations who retain antique words and language for notoriously long periods of time, forgetting their origins. Hence a Greek who had no knowledge of Egyptian culture or that it had ever penetrated to his homeland in earlier days would nevertheless call the cavern at Delphi which produced the sulphurous fumes the den of Typhon after its original Egyptian designation of tephut. It has been noted by people

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.64

## THE SIRIUS MYSTERY

other than myself and with greater knowledge that the Sumerian word for cavern, abzu, survived in Greek as abyssos, leading to our English 'abyss'.

The fumes arising from the Delphic cavern obviously gave rise to the usage of forms of the word for 'obscuring with smoke, dark' etc. And the fact that the personified Typhon became closely associated with Sirius was obviously due to the fact that this word which had entered Greek usage and been extended to considerations of 'darkness, obscurity', was useful in the traditional Sirius lore as adopted in Greece. The other meanings for the word then developed from there, except for the obvious popular usages, such as applying the word to a description of 'vanity' because vanity clouds a man's intellect—a really superb extension of the meaning for use in poetic and common expression.

It is probably considerations such as the Typhonic in the sense of Sirius B's association with darkness and obscurity, and hence with cavernous

blackness, that some of the Sirius-related divinities were reputed to live in the dark underworld in later times. The prototype of these is quite specifically Anubis, the embalmer of mummies. Anubis was not originally meant to be a death god per se and his association with mummies and the underworld has been previously explained. Egyptian mummies were, as I have said, embalmed over a period of seventy days, to correspond with the number of days each year when the star Sirius was 'in the Duat, or Underworld' and was not visible in the night sky. Hence the seventy-day 'death' of Sirius each year was the fundamental and earliest underworld aspect of the Sirius lore. Of course, Anubis, as the expression of the orbit of Sirius B, was invisible all the time, and not only for seventy days a year. Hence the permanent Typhonic darkness could be even further extended in later lore and a heightened sense of the importance of the underworld aspects could arise. This concept of invisibility and darkness must have become more and more important as time went on and the grasp of the nature of the mysteries became weakened by successive generations of initiates who were further and further from the original sources of information, though the Dogon even down to our time have maintained the information in a remarkably pure state. So there developed the underworld nature of the fifty-headed Cerberus-Anubis in Greek times. With the earlier Egyptians, as always with them, the underworld concept had been on more than one level. To the public the underworld aspect seemed to be entirely explicable by the disappearance of Sirius for seventy days—a fact which anyone could notice—and its reappearance following that period at dawn on the occasion of the star's heliacal rising. But the priests knew that the dark companion of Sirius was never visible. It would be worth while now to look a little more closely at the dog Orthrus, who was Sirius. Orthrus is the dog of the herdsman Eurytion. Graves interestingly compares this Eurytion with the Sumerian Enkidu, the companion of Gilgamesh who was hairy and wild and came from the steppes and was imbued with incredible strength. 20 "Eurytion is the "interloper", a stock character. The earliest mythical example of the interloper is the same Enkidu: he interrupted Gilgamesh's sacred marriage with the Goddess of Erech [Uruk], and challenged him to battle. It is particularly interesting to find the Greek companion of Sirius compared by Graves to the Sumerian Enkidu, whom I also have identified with the companion of Sirius. For companion of Sirius is precisely what Eurytion is, if Orthrus is Sirius and Eurytion the herdsman

## ORIGINS OF THE DOGON

.65

accompanies him, then Eurytion is the 'companion of Sirius'. And Enkidu is the strong hairy wild man who endured a trial of strength against Gilgamesh and became his companion after their wrestling match. Both Eurytion and Enkidu are hairy and rustic characters, and they seem to be related also to the god Pan, whose hairy and rustic nature classes him with them.

The motif of interloper—and of interrupting—and of challenging to a test of strength has to do with the fact that the bright star Sirius is challenged by its strong companion star. Graves adds: "Another interloper is Agenor"

and Agenor means 'very manly'. He interrupted the wedding of Perseus with Andromeda. Perseus was the son of Danae, great granddaughter of Danaos, who had fifty daughters. As we learn in Graves,<sup>21</sup> Danae herself had connections with an ark. Her father 'locked her and the infant Perseus in a wooden ark, which he cast into the sea. Later companions of Perseus in his exploits were 'a party of Cyclopes'.<sup>22</sup> This is yet another familiar ingredient.

Perseus fell in love with Andromeda, the daughter of Cassiopeia. Graves says <sup>23</sup> 'Cassiopeia had boasted that both she and her daughter were more beautiful than the Nereids, who complained of this insult', etc. And, of course, the number of the Nereids, it should surprise no one, was fifty. Of them, Graves says <sup>24</sup> 'The fifty Nereids seem to have been a college of Moon priestesses. Graves explains the recurring fifty in relation to moon lore. It is a brave but unconvincing solution, but how many scholars have even tried to find a solution?'

It is interesting in the light of our knowledge of Danaos having fifty daughters to read the opening of Pindar's tenth Nemean Ode<sup>25</sup> which is written largely about the city of Argos (a name related to Argo just as was the name Argus of the Argo's builder and as was the word 'ark').

The city of Danaos

And his fifty daughters on shining thrones,

Sing of it, Graces,

Of Argos, home of Hera, fit for the gods.

Perseus and Danae also have a connection with Argos. And as for the Graces here mentioned, their worship was first instituted at Orchomenos. The Graces are often associated with Hermes and called the Graces of Hermes and this occurs especially in a work such as *The Lives of the Philosophers*<sup>\*\*</sup> by the historian Eunapius, whose *Universa. History* was unfortunately lost. In the work just referred to, Eunapius tells us something extremely interesting about the area of Bendet and Canopus in Egypt. In speaking of Antoninus, the son of the remarkable and brilliant woman Sosipatra, Eunapius tells us, 'He crossed to Alexandria, and then so greatly admired and preferred the mouth of the Nile at Canopus, that he wholly dedicated and applied himself to the worship of the gods there, and to their secret rites'.<sup>27</sup> And also, 'Antoninus was worthy of his parents, for he settled at the Canopic mouth of the Nile and devoted himself wholly to the religious rites of that place'.<sup>28</sup> This is interesting, that there were rites peculiar to Canopus to which one could exclusively devote oneself. A little later,<sup>29</sup> Eunapius mentions that the Christians destroyed the temples in the vicinity and demolished the Serapeum at Alexandria, and set

## THE SIRIUS MYSTERY

ried their black-robed monks on the spot of Canopus in order to supplant paganism there. Hence, we see that that particular place had a unique importance. Surely it should be excavated. The pagan mysteries of the place, eventually destroyed by the Christians, probably continued the Bendet tradition and were related to our Sirius question.

But back now to the quotations from Pindar given above. What is so especially significant about this passage of Pindar's is the expression 'and his fifty daughters on shining thrones'. It will be remembered that the throne



is the hieroglyph for Ast or Isis identified with Sirius, that the fifty Anunnaki of Sumer were on thrones, etc. All through the earlier traditions there has been a great deal of emphasis on the throne in connection with the Sirius material, and here in the late Pindar we find the same. By describing him as 'late' I do so on our Sirius time-scale, for of course he was at the very earliest portion of the Greek classical age.

There are further connections between the Sirius system and Argos and Danaos. Connections with the Minyan Libyans are many. The father of Danaos was himself 'the son of Libya by Poseidon'.<sup>30</sup> Danaos was also 'sent to rule Libya'.<sup>31</sup> However, the connection with Egypt is also strong. Danaos's twin brother was called Aegyptos, of whom we read 'Aegyptus was given Arabia as his kingdom, but also subdued the country of the Melampodes [the 'black footed people' - the Egyptians], and named it Egypt after himself'. Fifty sons were born to him of various mothers - Libyans, Arabians, Phoenicians, and the like.<sup>32</sup> So we see Danaos's twin brother had fifty sons. And Danaos had fifty daughters. This demonstrates Graves's argument that they must refer to a college of fifty moon-priestesses, and emphasizes the connection with the fifty male companions of Gilgamesh, fifty male Argonauts, fifty male Anunnaki, etc. Notice the two related but also quite definitely separate groups of fifty here. Together they add up to a hundred - a hecate - and have the same grandparents, but they are basically two separate fifties. Not only do they have separate parents and especially separate fathers, but they are separately distinguished by sex.

Danaos learns that his brother wishes to marry his fifty sons to Danaos's fifty daughters with the aim of their killing the fifty daughters after marrying them. So Danaos and his daughters all take flight to Rhodes\* and then to Greece where they land and Danaos announces that he is divinely chosen to become the King of Argos. Note that he chooses Argos. Thus and his connection with fifty are especially important, later when I give the derivation of the words Argo, Argos, etc. And it is particularly interesting that when Danaos flees his brother

he does so in a ship which he built with Athena's assistance – exactly the case with the Argonauts, who built the Argo with Athena's assistance

The way in which Danaos became King of Argos was that a wolf came down from the hills and killed the lead bull, and the Argives accepted the omen. Danaos, convinced that the wolf had been Apollo in disguise, dedicated the famous shrine to wolfish Apollo at Argos, and became so powerful a ruler that all the Pelasgians of Greece called themselves Danaans. He also built the citadel

\* This may be an indication that Rhodes, at latitude 36 deg 30', does indeed belong in the sequence of oracle centres as was only tentatively suggested in the chart at the end of Chapter Five

## ORIGINS OF THE DOGON

167

of Argos, and his daughters brought the Mysteries of Demeter, called Thesmophoria, from Egypt and taught these to the Pelasgian women. But, since the Dorian invasion, the Thesmophoria are no longer performed in the Peloponnese, except by the Arcadians. 33

It is well known that the Pelasgians survived in Greece only in remote Arcadia after the Dorian invasion. This is why some of the older traditions continued in that strange region after they had ceased to exist elsewhere in Greece. Arcadia was in a sense the Wales of Greece. The Pelasgians considered themselves earth-born, as I shall discuss in a moment. Note that there is a specific reference to Egyptian mysteries being transplanted in Greece among the Pelasgians. When Danaos fled from Egypt to Argos, he is specifically said to have brought Egyptian mysteries, the Thesmophoria. Presumably the Sirius-complex was thus transplanted. (One should read Herodotus II, 165-70.) The element of the wolf, sometimes substituted for the dog in the Sirius tradition of the Dog Star, is important. It is an obvious European substitute for the non-existent jackal of Anubis. With no jackal in Europe, the wolf was the candidate. Wolfish Apollo is jackalish. It was from this changing of the jackal into the wolf through adaptation to the European climate that those peculiar wolf traditions arose in wild Arcadia which developed in pre-classical times into the werewolf concepts. Human blood-sucking vampires, the use of garlic for protection against them, and lycanthropy of werewolves all luxuriated in the wilds of Arcady among the Pelasgian survivors in pre-classical Greece after the Dorian invasion. The phenomenon is rather like the plethora of fairy tales and 'Celtic twilight' to be found in Ireland, with the multitude of fantastic stories and creatures. What is a werewolf? It is a man's body with a wolf's head. That is exactly what Anubis became when transferred to Greece – instead of a man's body with a jackal's head, he was a man with a wolf's head because there was no jackal in Greece. And the temples of Wolfish (or Lycian) Apollo, were not altogether rare in Greece. Aristotle's famous school at Athens, the Lyceum, was in the grounds of the Lycian Apollo's temple just outside the Athens Gate of Diocleares. The name 'Lyceum' comes from the Lycian Apollo, which is the Wolfish Apollo.

It is extremely interesting, incidentally, to read in Pausanias (Book II, 38,



4) that near Argos 'are the Landings, where they say Danaos and his sons first landed in the Argolid' Here we read that Danaos had sons, not daughters This is a strong indication that what was really meant to be significant about Danaos's progeny was not their sex but their number of fifty And from Pindar we see that they were on fifty thrones The fact that Aegyptus of Egypt had fifty sons as well and that Danaos's daughters (or sons) taught the Egyptian mysteries to the Greeks all indicates that what transpired was a transplanting from Egypt to Greece of the all important tradition to be common to both countries from then on the fifty as linked with the Dog Star Sirius and as celestial thrones In other words, the mystery of the orbit of Sirius B around Sirius A in its fifty celestial steps

According to Graves,<sup>34</sup> the serpent's teeth sown by Jason were a few left over from Cadmus's sowing at Thebes' Graves says of the latter: <sup>35</sup> 'A small tribe speaking a Semitic language seems to have moved up from the Syrian plains to Cadmeia in Caria Cadmus is a Semitic word meaning "eastern" -

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## THE SIRIUS MYSTERY

.68

whence they crossed over to Boeotia towards the end of the second millennium, seized Thebes, and became masters of the country The myth of the Sown Men ' But before continuing his explanation I shall quote his description of the events In Plate 15 is an ancient Greek vase painting of Cadmus standing above a hare, just as Orion stands' on Lepus, the Hare, in the night sky Graves tells us <sup>36</sup>

Cadmus sailed with Telephassa to Rhodes [where Danaos also stopped in his flight to Argos], where he dedicated a brazen cauldron to Athene of Lindus, and built Poseidon's temple, leaving a hereditary priesthood behind to care for it [Like Danaos, Cadmus instituted religious rites where he went] They next touched at Thera [the place from which the Minyae later left their settlements there to go to Libya], and built a similar temple, finally reaching the land of the Thracian Edonians, who received them hospitably Here Telephassa [who was Cadmus's mother and whose name means 'Tar shiner', her husband and Cadmus's father was 'Agenor, Libya's son by Poseidon and twin to Belus (who) left Egypt to settle in the Land of Canaan, where he married Telephassa, otherwise called Argiope ("bright face"), who bore him Cadmus, etc. And notice the name Argiope, related as it is to what we will discuss in a moment as the Argo-complex of words and the related meaning of argent, silver, taken here as the shade of meaning from this large Argo-complex] died suddenly and, after her funeral Cadmus and his companions proceeded on foot to the Delphic Oracle When he asked where Europe (his lost sister) might be found, the Pythoness (of Delphi) advised him to give up his search and, instead, follow a cow and

build a city wherever she should sink down for weariness at last (the cow) sank down where the city of Thebes now stands, and here (Cadmus) erected an image of Athene, calling it by her Phoenician name of Onga. Cadmus, warning his companions that the cow must be sacrificed to Athene without delay, sent them to fetch lustral water from the Spring of Ares [Mars], now called the Castalian Spring, but did not know that it was guarded by a great serpent. This serpent killed most of Cadmus's men, and he took vengeance by crushing its head with a rock. No sooner had he offered to Athene the sacrifice than she appeared, praising him for what he had done, and ordering him to sow the serpent's teeth in the soil. When he obeyed her, armed Sparti or Sown Men, at once sprang up, clashing their weapons together. Cadmus tossed a stone among them [just as Jason later did] and they began to brawl, each accusing the other of having thrown it, and fought so fiercely that, at last, only five survived: Echion, Udaeus, Chthonius, Hyperenor and Pelorus, who unanimously offered Cadmus their services. But Ares demanded vengeance for the death of the serpent, and Cadmus was sentenced by a divine court to become his bondsman for a Great Year.

Note here that the serpent's teeth motif is again linked with the concept of fifty. For the Great Year is a hundred months long and consists of two separate cycles of fifty months, as I have mentioned before. It is just as well for us that Hyginus and Apollodorus have preserved this interesting bit of information which Graves has passed on from them. The 'Spring of Ares' resembles 'the

## ORIGINS OF THE DOGON

169

grove of Ares' where the golden fleece was hung and both were guarded by serpents. And in both the story of the Argo and this story the hero throws a stone in the midst of the sown men. The stone motif again, a thrown stone being central to the Deukalion story and to the Orkomenos ghost, etc. And it was a stone with which Cadmus crushed the serpent's head as well.

The cow in the Cadmus story is also reminiscent of the Egyptian sacred cow Hathor who was identified with Isis. Hathor is the form we use for the original Egyptian He-t Her, which means 'the House of Horus' (Horus is, of course, our form for the Egyptian Heru, or Her).

It is interesting that the cow Hathor 'House of Horus' is identified with Isis, who, as Sothis, is the star Sirius and who is also the Mother of Horus. Hathor seems to be meant to represent the actual Sirius system, the 'house' or area in the celestial regions. And significantly the sister of Isis, Nephtys, whom

I have earlier identified with Sirius B, the dark star of the system, is our form for the original Egyptian Neb-t He-t, which means 'Lady of the House'. The reader will recall a previous discussion of the word Neb meaning 'Lord'. Neb-t is merely the female form of the word, and means 'Lady'. And presumably the house of which Nephtys is the Lady is the House of Horus. In other words, the lady is just as much a resident of the area of Sirius as is Sirius herself. Just

because she is the dark sister does not mean that she is not quite as much at home in the House of Horus as Isis

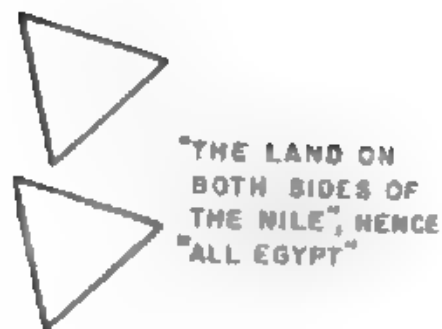
So much for the cow who led Cadmus to the serpent's teeth. It will all make even more sense as we go along. Wait til. we find out what 'serpent's teeth' really means

Now to resume Graves's commentary on all these Cadmean adventures at Thebes. 37 'The myth of the Sown Men and Cadmus's bondage to Ares suggests that the invading Cadmeans secured their hold on Boeotia by successfully intervening in a civil war among the Pelasgian tribes who claimed to be autochthonous [ sprung from the earth'], and that they accepted the local rule of an eight year [one hundred months according to Graves's lunar theories, but it really comes to only ninety six] reign for the sacred king. Cadmus killed the serpent in the same sense as Apollo killed the Python at Delphi (see 21.12). The names of the Sown Men: Echion ('viper'), Udaeus ('of the earth')

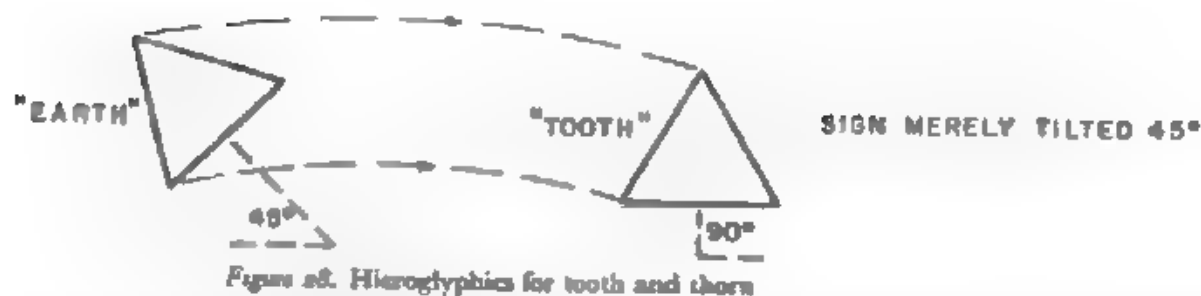
At this point I shall interrupt him once again. 38 Let us look at this strange name Udaeus. We should note that the similar word ~~δάξ~~, (odax) means 'by biting with the teeth' and comes from the verb root ~~ἄκ~~ (~~ἄκ~~) and its infinitive

δάκναι which means 'to bite'. of dogs. Perhaps this is a clue as to the importance of teeth, since in Greek there was this word 'to bite' which specifically referred to the biting of dogs and it may be that this aspect of dogs was incorporated at a pre-Hellenic early date into the lore of the Dog Star by one of those many puns which proliferated in all the high civilizations of the Mediterranean. We must, in order to understand the ancient inclinations to punning, rid ourselves of our

modern prejudice against puns as a form of humour. Puns in the ancient world had no direct humorous intent. In a milieu where codes and allegories were sorely needed, puns provided the handles to new ways of cloaking truths by use of synonyms. If it was a game, it was a sacred game, a ludens. For Thebes was the site of the Castalian Spring, as just mentioned a moment ago, and was intimately part of the milieu of the gods of the ancient world.



ALSO



Also, where circle meant rings so does daktylios which specifically means 'anything ring shaped'. Thus we see another meaning in common in our complex of interweaving terms connected with Sirius traditions. A possible further example of this is in the hieroglyphics of Egypt. Wallis Budge informs us in Egyptian Language, in his list of hieroglyphs,<sup>39</sup> that the sign for thorn (which is the tooth of a plant) is almost identical with the sign for Sothis-Sirius. The same sign tilted 45° represents ateb, the land on one side of the Nile, and if placed one on top of another forming a pair, means 'all Egypt'.

The very same sign is incorporated in the sign for art meaning 'jawbone with teeth'. Remember Gilgamesh with his jaw to the earth 'and his teeth shook'. Certainly this all seems to mean something. In fact, the same single sign which means the land on one side of the Nile<sup>5</sup> and looks like a tilted tooth, also has the general meaning of 'earth' which latter concept is so important in all the later Greek Sirius-traditions. It may well be that all these puns on the determinative hieroglyphic sign for Sirius came, in the usual way with the pun-loving Egyptian priests, to form a complicated body of Sirius doctrine involving teeth, Earth-born, ring-shaped, falcon or hawk (Circe), etc., etc. It should therefore not surprise us in the least to learn that the ancient Egyptian word for 'tooth', abeh has exactly the same hieroglyph as the word for Earth. Hence the origin, almost without question, of the connection between teeth and the Earth! For in ancient Egypt they were written by the identical sign, which were tilted forms of the same sign used to represent Sirius!

#### Notes

- 1 Peter Levi's translation of Pausanias, op. cit.
- 2 Graves, The Greek Myths, op. cit., 120-1
- 3 Ibid.
- 4 Ibid., 120-1
- 5 Larousse Encyclopaedia of Mythology, Paul Hamlyn, London, 1965, pp. 90-1
- 6 Lindenblad, op. cit. (see Notes to Chapter One). See also further discussion in Chapter Eight
- 7 Greek Myths, 131 g. and 131-2
- 8 Proclus on Euclid's Elements, op. cit. two translations, one by Thomas Taylor (1792) and one by Glenn Morrow (1960s). A translation by Thomas Taylor of much of Simplicius's commentary on Aristotle's De Caelo (On the Heavens) may be found in The Works of Aristotle, London, 1806-12, 9 vols., all trans. by Thomas Taylor and 'printed for the translator'. However only fifty copies were printed and not a single volume of this work is to be found either in the British Museum Library or in the Bodleian Library at Oxford. The publication was financed originally by William and George Meredith, patrons of learning at the beginning of the nineteenth century. Patrons of this kind of learning seem thin on the ground these days, since the Bollingen Foundation in New York has ceased its benefactions, Geoffrey Watkins, the London publisher and bookseller who would occasionally reprint Thomas Taylor's work in small editions, has now retired and his successors have abandoned his policies to concentrate on ecology. The above 9 vol. work contains the only English translations ever done of the majority of the Neoplatonic commentaries on Aristotle. And yet, not only are these translations unavailable in print, but they are even not available for consultation in the world's most respected libraries, so that one may not even see them. (These libraries really should make some effort to obtain photostats or microfilms of the books.) A friend of mine owns a few volumes of this set and an acquaintance had a chance to buy

some of the volumes at a Sotheby's auction but said they reached a terrible price which he thought beyond his range

## 9 Greek Myths, 3.C

.72

### THE SIRIUS MYSTERY

.10 Ibid 33

11 Benardete, Seth Herodotean Inquiries, The Hague, 1969, p. 126

.12 See the end of his Introduction to Greek Myths, op cit

.13 The four books by Eva Meyrowitz are now out of print. In the fourth book of the series (see Note .14) the author describes the series. 'This is the fourth volume of the series of which the first, The Sacred State of the Akan [1951], gives a picture of the old Akan civilization. The second, Akan Traditions of Origin [1952], deals with the early history of the people who now call themselves Akan. The third, The Akan of Ghana, their Ancient Beliefs [1958, originally entitled The Akan Cosmological Drama] showed the development of their religion. The fourth, here presented, attempts to show that Akan religion, which includes the cult of the divine king and the main features of their social organization, is largely derived from Ancient Egypt.' Eva Meyrowitz is an anthropologist from Cape Town who worked in the Gold Coast (now Ghana) from 1936-45 studying the peoples of that country. The third volume mentioned above (1958) contains a final chapter which is entitled 'Analogies to Akan Beliefs and Customs in Libyan North Africa'. As for the Akan peoples, they speak languages of the Twi branch of the Kwa sub-family of the Western Sudanic linguistic stock and inhabit the eastern part of Ivory Coast, the southern half of Ghana, and parts of Togo. The majority are in Ghana, where they settled in successive waves between the 11th and 18th centuries. All of Meyrowitz's books above, and the fourth mentioned in Note 14, were published by Faber in London.

.14 The Divine Kingship in Ghana and Ancient Egypt (originally entitled The Akan of Ghana, the Akan Divine Kingship and Its Prototype in Ancient Egypt), Faber, London, 1960. Went out of print in February 1963. The map is adapted from one in this book.

.15 Greek Myths, op cit, 8

.16 Ibid 82

.17 Ibid 34.

.18 Ibid 21.2

.19 Ibid 34.1 and 34.3

20 Ibid 143-5

21 Ibid 73 C

22 Ibid 73 p.

23 Ibid 73 J

24 Ibid 33 3

25 The Odes of Pindar, trans, by G M Bowra, Penguin paperback, 1969, p 176.

26 Eunapius, Lives of the Philosophers and Sophists, trans, by W C Wright, in Vol No 134 of Loeb Library Series (Philostratus and Eunapius) Heinemann, London Harvard University Press, U S A. 1961

27 Ibid p 419 (text, 471)

28 Ibid p 417 (text, 470)

29 Ibid pp. 421-5 (text 472) Next, into the sacred places they imported monks, as they called them, who were men in appearance but led the lives of swine, and openly did and allowed countless unspeakable crimes. But thus they accounted piety, to show contempt for things divine. For in those days every man who wore a black robe and consented to behave in unseemly fashion in public possessed the power of a tyrant, to such a pitch of virtue had the human race advanced! All this however I have described in my Universal History. They settled these monks at Canopus also, and thus fettered the human race to the worship of slaves. ' Among the unspeakable crimes being referred to was the destruction by Bishop Theodosius of the Great Library of Alexandria because it contained 'heathen literature. Hence, the loss of the hundreds of thousands of books from the ancient world, which everyone laments so often, took place at the hands of a fanatical Christian bishop attempting to wipe out all trace of history before Christ, and not as the result of an accidental fire from the time of Mark Anthony, as the story is usually told.

30 Graves, Greek Myths, op cit , 60 a

31 Ibid 60.b.

32 Ibid 60.b.

33 Ibid 60.f

34 Ibid 152 C

35 Ibid 58 5

36 Ibid 58 e.g.

37 Ibid 58 e.g.

38 I will complete the quotation from Graves here: ' Chthonius ("of the soil"), Hyperenor ("man who comes up") and Pelorus ("serpent") are characteristic of oracular heroes. But "Pelorus" suggests that all Pelasgians, not merely the Thebans, claimed to be born in this way their common feast is the Peloria (see 1 2 )' The remaining three names are thus seen to be quite as one would expect

39 Wallis Budge, E. A Egyptian Language, Routledge, Kegan Paul Ltd , London, 1951, pp. 43-94

## SUMMARY

In Greek mythology there were fifty daughters of King Thestios (or Thespius) with whom Hercules (in Greek, Herakles) who is said to have been the predecessor of Jason as leader of the Argo and who is demonstrably derived in part from Gilgamesh, had sexual intercourse on fifty successive nights. Again, the number fifty is seen as related to intervals of time in this instance days instead of months and again in connection with the complex of myths concerning Sirius.

The monsters Cottus, Briareus, and Gyges of Greek mythology each had fifty heads. Briareus was the original name of the figure later called Hercules, and as Hercules was the original Jason, it is seen that the original commander of the fifty-oared Argo was a fifty-headed gentleman. The name Briareus is derived from words meaning 'strength' and 'weight'. Gyges also means 'strength'. As for the name Cottus, Robert Graves says that it is not Greek. In fact, it seems to be derived ultimately from Egyptian qeti meaning 'oarsmen' (not surprising, since Briareus was the original commander of the fifty-oarsmen), and also 'orbit'. The fact that in Egyptian the words for 'oarsman' and 'orbit' are the same may explain why fifty oarsmen are symbolic of a fifty-year orbit. Oar-strokes are ideal constant intervals of time combined with constant intervals of space (distance traversed) and thus perfect symbols of intervals of an orbit. In Greek the Egyptian word meaning both 'orbit' and 'oarsmen' seems to survive as the name of a fifty-headed monster. The conclusion: an orbit of fifty intervals (years) concerned somehow with Sirius and with something called 'Weight' (already known to be assigned by the Arabs to a visible companion of Sirius) obviously, the fifty-year orbit of Sirius B is being referred to.

Garamas, a brother of the three above-named monsters, is a name also adopted by the Garamantian people. These Garamantians were Libyan residents who migrated from there by way of Algeria to the banks of the Niger River in Mali where they intermarried with local Negroes.

The Argo was reported to have stopped in Libya for some time which resulted in the foundation in Libya of 'a hundred Grecian cities'. The Libyans from whom the Garamantians came are reputed to be descended from the Argonauts' through migrant Lemnian Greeks who settled in Libya. These same Garamantians over hundreds



Indeed, thousands of years in their migration to Mali obviously brought to that region as the most secret and holy of all their sacred traditions the sacred Sirius tradition now propounded by the Dogon, who are presumably their descendants. (The Dogon themselves insist that they were definitely not originally native to their present homeland in Mali.)

The Libyan version of the Greek goddess Athena had fifty Pallantids' as priestesses, with evident association at an early time with the Garamantians.

The dog Orthrus, brother of the god Cerberus who had fifty heads, was specifically identified by the Greeks with the star Sirius. Robert Graves equates Anubis, Cerberus, and Hecate with each other. This brings together Anubis-the-orbit with Cerberus the

, 74

## THE SIRIUS MYSTERY

fifty-headed dog, and Hecate meaning 'one hundred', as well as Orthrus who is Sirius the Dog Star.

The father of Orthrus was Typhon, one meaning of which is a kind of comet or a 'moving star'. Another meaning is 'blind' or 'darkened'—that is, we see it could refer to a moving but invisible star. And his son Orthrus is clearly identified with Sirius, and had a brother with fifty heads.

Orthrus (Sirius) was the dog of the herdsman Eurytion whom Robert Graves compares with Enkidu, the companion of Gilgamesh. It is possible the name Orthrus may be derived from the Egyptian urt meaning 'the setting of a star'. We see this same word used in reference in Chapter Seven to the Sirius complex.

The Argo carried the fifty daughters of Danaos, who was 'sent to rule Libya' and had a twin brother Aegyptus, king of Egypt (which got its name from him), who had fifty sons. Sometimes Danaos is said to have fifty sons instead of fifty daughters. It was obviously their number which mattered, not their sex.

'The old man of the sea' named Nereus to the Greeks, had fifty daughters called the Nereids (who are enumerated by Hesiod in his *Theogony*, 241). An 'old man of the sea' is reminiscent of Oannes and Enki—of amphibious wise men generally.

The Greek poet Pindar (fifth century B.C.) describes the fifty Danaids as 'on shining thrones'—reminiscent of the fifty Anunnaki on their shining thrones, of Isis on her shining throne. (The throne is the hieroglyph of Isis who is identified with Sirius.) Danaos is also associated with the wolf—or dog—motif, and that motif refers to the Dog Star, Sirius.

## CHAPTER SEVEN

## The Rising of 'Serpent's Tooth

It would now do to elaborate further on the points so recently made. It should be noted that in Egyptian the hieroglyph *tchet* of a serpent means both 'serpent' and 'bods'. The cobra hieroglyph *ara* means both 'serpent' and goddess. Elsewhere we encounter *ara* frequently having the common general meaning of 'goddess'. The frequent incorporation of the serpent into late Sirius-lore among the Greeks probably stems from a pun or corruption of the Egyptian determinative form for goddess in reference to the goddess Sothis-Isis (Sirius). In fact, if an Egyptian were to write the Goddess Sirius in hieroglyphs, the result would be

which can also (by pun) be read quite literally as: 'serpent's tooth'. In addition to this Egyptian pun, there is a Greek pun connected with the story of Jason sowing the teeth. In Greek the word which describes the growing of a tooth from the gum is *anatoie*, a variant is *anateio*. These words would describe the growing from the ground of the teeth and to make to rise up' or to give birth to is their basic meaning. However, these words are also used to describe the risings of stars and constellations. Hence, if one wanted to say that the star Sirius was rising at the horizon, one could pun and say "The tooth is growing up from the ground as from a gum, that is, the ground is giving birth to a tooth". Hence all the many 'earth-born' creatures linked to the stars, and especially Sirius. As a matter of fact, in translating the now lost early Argo tales from Greek into English it is problematical whether instead of saying 'the teeth in the ground gave birth to', etc. one should really have considered the equally literal translation 'Sirius, namely "the tooth" rose over the horizon. In short, when does a pun cease to be a pun and merely consist of a mistranslation based on ignorance of the true subject matter?

It may be that some of the puns taken over from Egyptian into Greek might have involved the same misunderstandings that ours could do with regard to translating the Greek into English. There may thus be a double layer of obfuscation between English readers and the true subject matter. Those experts in Greek mythology who may feel safe in discussing 'earth-born' mythological creatures as being sprung from the earth in a direct sense, mud and grime no doubt still caking their hides as they pop up into the air, may be better advised to take into consideration that these creatures were not meant really to be described as coming out of holes in the ground so much as rising over the



horizon, due to the fact that they are stars and constellations. And if they are such cosmic figures their peculiar shapes and characteristics become immedi-

ately less bizarre and, instead, more meaningful

We know that Colchis was the place where Helios stabled his horses and rose each morning according to Greek mythological tradition. Since Colchis was thus the archetypal eastern rising point to the Greeks, being at the far eastern end of the Black Sea and being 'as far east as you can get' to a Greek, it actually represented the East'. Thus it makes sense that Jason should have sowed the serpent's teeth there. For the growing of the teeth from the ground at that precise point was symbolic language for 'The star (goddess) Sirius, known in code as "serpent's tooth", is rising heliacally on the eastern horizon which is symbolically represented by Colchis. And since the sun follows immediately upon the star at its heliacal rising, all the more reason that 'Serpent's Tooth' should spring up at the place where the Sun, Helios, spends the night and then rises.

The reason why the only other example of serpent's teeth being sown took place at Greek Thebes, when Cadmus sowed them there, is that Egyptian Thebes and Aea at Colchis are equidistant from Greek Thebes (see Figure 14). Hence, a probable reason for the name of Thebes being used in Greece. Greek Thebes is in a sense a 'code' for Colchis, since an action performed there may be understood as taking place within the symbolic framework of the Thebes-Colchis-Thebes triangle (Figure 14). To go to Thebes in Greece was symbolically to step on to the Colchis axis. To sow the teeth at Greek Thebes was to perform the Colchian action on Greek soil because of the knowledge of their geodetic interrelation. This kind of thinking is based on a theory of correspondences such as the Dogon exhibit in all their most minute daily acts. In my opinion, a mind is healthy which can perform symbolic acts within mental frameworks which are not immediately obvious. A mind is diseased when it no longer comprehends this kind of linkage and refuses to acknowledge any basis for such symbolic thinking. The twentieth century specializes in producing diseased minds of the type I refer to - minds which uniquely combine ignorance with arrogance. The twentieth century's hard core hyper-rationalist would deride a theory of correspondences in daily life and ritual as 'primitive superstition'. However, the rationalist's comment is not one upon symbolic thinking but merely one upon himself acting as a label to define him as one of the walking dead.

Greek Thebes Phthiotides - quite distinct from the main Greek Thebes almost adjoins Ioichus in Thessaly, a few miles away, from which port Jason and the Argo sailed to Colchis. The voyage of the Argo may be seen as a symbolic journey. For to travel from Greek Thebes - either the proper one or a nominal substitute - to Colchis was equivalent to traveling from Greek Thebes to Egyptian Thebes: the distance was the same. Greek Thebes, where 'serpent's teeth' were sown, is equidistant from Colchis, where 'serpent's teeth' were sown, and Egyptian Thebes, where 'Serpent's Tooth' was worshipped. And a ship travelling on one of the lines in effect travels on both. The voyage of the Argo, a later form of the magan-boat, or Egypt boat - was both to Colchis and to the equidistant Egyptian centre of Thebes, where the prime omphalos was placed in the temple of Ammon.

The name of Danaos who fled Egypt with his fifty daughters (or sons) and went to Argos seems to be derived from ~~Danaos~~ Danae, which is 'the mythological

name for Dry Earth, according to Liddell and Scott, whose union with the fructifying air is expressed in the fable of Zeus and Danae'. And Danae, as we have seen, is associated with the Sirius complex and was also set adrift in an ark. It may or may not be relevant that the Egyptian hieroglyph for wind or air, with which Danae is supposed to have united, is a boat's sail.

The word 'ark' itself is an interesting one worth investigating. We already know that the related word Argo was the ship of fifty oars which we believe symbolized Sirius B in its fifty year orbit. Could this word 'ark' also have a tie-in with the other characteristic of Sirius B, namely its strength? In this we are not disappointed. The Greek verb (arkeo) has the meaning, according

to Liddell and Scott's lexicon, of 'to be ~~strong~~ strong enough'.

The word Argus has even applied to a dog. It was the name of the old hunting hound of Odysseus (Ulysses) who recognized his master Odysseus when he finally returned from his voyages, and died as it greeted him. No one else had recognized Odysseus after twenty years' absence except for the faithful old dog, who upon greeting his long lost master, expired on the spot.

Argus has also been used by the Greeks as their name for the hundred-eyed monster set by Hera to watch over Io. And it was Io the cow who led Cadmus from Delphi to Thebes where he sowed the serpent's teeth.

If the words ark, Argo, Argus, etc., could be construed as having an actual linguistic derivation from the ancient Egyptian (which would have had to precede by some time the Aryan invasion of India circa 1500 B.C., as the word exists in Sanskrit, as we shall see shortly), then it might ultimately be from arq and arqi which are

These related words have various curious meanings in Egyptian and can be written many ways other than the simplest given above. Arq means 'to complete, to finish', in the sense of a cycle. It also means 'the last' or 'the end of anything'. For instance, arq renpet means 'the festival of the last day of the year'. Arqit means 'the conclusion of a matter'. All these meanings are reminiscent of the meaning of 'Argus' in Homer - to represent the dog who witnesses Odysseus's return and immediately dies, having seen his master's face once again after so many years. The great cycle was completed. Odysseus was home. And immediately Argus dies. Here in the earliest Greek literature we see Argus used as a synonym for the Egyptian arq.

The Egyptian arq is even more significant. Note the final determinative (picture not used as a letter) is a sign which is a circle with a dot in the middle. The meaning of this word is 'the end of a period, the last day of the month'. This term, then, has calendrical usage. It can be applied as well to any culmination of a period. Hera's monster Argus has a hundred eyes, and there are a hundred months (comprising two sets of fifty) to a Great Year. Here Argus is a poetic synonym in early Greek tradition for arq, 'the end of a period' - its culmination, its total when completed.

Our suspicion that there is a distinct reference to an orbital period of

70 and 70 80



**Figure 29. Io watched by Argus, with Hermes. From 1st-century A.D. Italian temple of Isis, preserved on wall of inner sanctum**

## THE RISING OF 'SERPENT'S TOOTH'

179

Sirius B is hinted at by the additional meaning of arq 'girdle', representing as it does something around a centre. Arq has the further verbal meaning of 'to bind around', implying specifically a revolution. The Latin arcere means 'to enclose' and our present day word 'arc' carries on the circular motion idea.

Not surprisingly, an arq is 'an educated man, a wise man, an expert, an adept'. It is not difficult to realize that anyone privy to the mysteries of arq would have to be an adept, an initiate and wise man. Hence this meaning for someone who knows about arq, an arq.

In Wallis Budge we find<sup>2</sup> a description (taken from Mau) of an Egyptian-influenced Italian temple of the first century B.C. which contained seven large paintings representing Egyptian landscapes, and Io watched by Argus, and Io received by Isis in Egypt. [A drawing of the painting of Io watched by Argus is reproduced in Figure 29. It is in Roman style, of course, and artistically quite mediocre.] In this room the Mysteries of Isis were probably acted. 'So we have specific archaeological evidence that Argus of the hundred eyes was pictured on the wall of the inner sanctum of an Isis temple and Isis was, as we know, identified with Sirius. Also pictured there was Io, whom I earlier compared to the Egyptian Hathor who was identified with the Sirius system, and it was of course this same Io who led Cadmus to the Greek Thebes (there being an Egyptian Thebes as well, as the reader well recalls).

What were these mysteries of Isis? Well, they seem to have been related to the Thesmophoria Mysteries which the daughters of Danaos were said to have brought from Egypt to Argos. For in Lidde... and Scott we find that the name Thesmophoros ('law giving') was a name given to Isis. The name was most commonly applied to Demeter, a Greek goddess, but was also the name of Isis in Greece. In short, Isis was represented as Demeter in connection with these mysteries, but in the Italian temple referred to above was obviously represented as herself. The 'fifty and hundred' connected as we have seen with Danaos, are found again here in the ruins of this Italian temple, where hundred-eyed Argus is portrayed in the inner sanctum of the Isis temple. The name Thesmophoros should not distract us too much. It comes from Thesis, with a meaning including our thesis of today and thesmos means 'that which is laid down or established, or instituted'. And thesmodeo is a verb meaning 'to

deliver oracular precepts', once again a meaning which should not surprise us \*

In Wallis Budge we read<sup>3</sup> from an Egyptian text of 'the star Septet (Sothis, the Dog Star), whose seats are pure', which is a specific reference to there being seats around Sirius and, of course, there are fifty seats as we know, which led to the fifty thrones of the Anunnaki the fifty oarsmen of the Argo, etc

In Wallis Budge we also read<sup>4</sup> excerpts of Egyptian texts speaking of holy emanations proceeding from Sirius and Orion which 'vivify gods, men, cattle, and creeping things both gods and men and are a pouring out of the seed of the soul Of course, the Dogon maintain the same thing in almost precisely the same terms. To them the seed which energizes the world pours forth from the Sirius system

In Wallis Budge we find also a particularly interesting bit of further

\* Plutarch in Isis and Osiris (378 D) informs us Among the Greeks also many things are done which are similar to the Egyptian ceremonies in the shrines of Isis, and they do them at about the same time At Athens the women fast at the Thesmophoria sitting upon the ground. <sup>5</sup>

.80

## THE SIRIUS MYSTERY

information.<sup>6</sup> There we learn that the deceased spirit of a man 'goes to Nephthys' and the celestial boat We have much earlier identified the dark Nephthys with Sirius B It is therefore interesting to learn that as soon as the deceased visits Nephthys and his double (ka) is recorded in heaven, he immediately revolves like the sun' which I think is a pretty specific astronomical description. As he revolves he leads on the Tuat (underworld or heaven) which is a curious turn of phrase implying a round dance or at least motion which is purposeful, 'and is pure of life in the horizon like Sam (Orion) and Sept (Sirius, the Dog star)' I hope it will be noticed that the phrase here reads 'in the horizon' and much earlier I said I believed the term 'the horizon' applied specifically to the orbit of Sirius B Here we have the deceased revolving like a sun in a purposeful way in 'the horizon' I don't think the Egyptians could possibly have been more specific and clear than this. Wallis Budge comments 'The mention of Orion and Sothis is interesting, for it shows that at one time the Egyptians believed that these stars were the homes of departed souls'

Having learned this (a belief held as well by the Dogon, as we know), let us return to our word arq which I believe to be the origin of ark and Argo and Argus in Greek, all of which I claim are related to Sirius Perhaps the reader will not be too amazed if by now I inform him that arq heh is a 'necropolis and arq heht is 'the Other World' which we have just this moment learned was located by the early Egyptians at the star Sirius' (Also remember that the

guardian of the necropolis in Greek was a circe in the Argo story )

Arq has the further meaning of 'a measure', possibly because spirits are normally measured in Arq-heht

And for final touches of mystery I will add that arq can mean 'to wriggle (of a serpent)' from 'binding around' and arq ur is the word for that mystery of mysteries, the Sphinx!

The same word means also 'silver', and Wallis Budge claims that the Greek (argyros) is derived from it, which gave us our heraldic term argent and the country's name Argentina. Since this term in Greek is derived from arq ur (ur means 'chief or Great'), in the opinion of an eminent expert, I believe there is no objection then to my suggestion that the other Greek words came from arq and its forms. \* But, as I said, this derivation is one which entered Indo-European from Egypt before the Aryan invasion of India, for in Sanskrit arksha means 'stellar, belonging to or regulated by the stars or constellations' and arksha varsha is 'a stellar year or revolution of a constellation'. This is very similar to the meaning in Egyptian of 'the end of a period', and a calendrical application to the end of a month. In Sanskrit again arka means 'belonging or relating to the sun'. Arkam means 'as far as the sun, even to the sun inclusively'. Arki has become a name for Saturn, thought at that time to be the most distant planet. Arc means 'to shine, be brilliant' and can mean 'to cause to shine'. Arkin means 'radiant with light'. Arka means 'a ray' and is also a religious ceremony. An arka-kara is a 'sunbeam'. Arkaja means 'sun-born, coming from the sun', and it and arkanandana can be applied to the planet Saturn. Arkaparna

♦ In discussion with Professor O. R. Gurney of Oxford, who was sceptical of Egyptian origins of Indo-European words, I found that he considered Wallis Budge's suggestion possible on two bases: (1) The word is a technical one, (2) my explanation of the Cochian connection as providing a geographical forum for such linguistic influence.

## THE RISING OF 'SERPENT'S TOOTH'

18.

is the name of a snake demon. Arka-putra is also Saturn. Forms of the word relate also to various specific astronomical events and the Arka ceremony and the arka plant which has 'a grain of fruit' of some importance, reminding one of all the grains of the Dogon (which one learns about by reading more about the Dogon than I have given in this book) particularly the grain Dagitaria which gave its name to Sirius B among the Dogon—in their own language, of course!

Area means 'worship, adoration'. Arjuna, besides being the famous Hindu mythical personage, means 'white, clear' and 'made of silver'—this latter being clearly a form of arq ur, the Egyptian variant form of arq meaning 'silver', which I mentioned a moment ago and which, according to Wallis Budge, has the cognate in Greek which was just mentioned, argyros meaning 'silver'.



And as Argo is a constellation in the sky, it should not be a surprise to us to find that in India the Sanskrit Arjuna refers to a specific Vedic constellation. The actual name of the constellation is Phalguni. Phala means 'grain' or 'seed'. The Phal-grantha is a work describing the effects of celestial phenomena on the destiny of men.

There is also a connection of the Sanskrit with an expression involving a thigh, in Greek, Arktos became a name for our constellation Ursa Major which was known to the Egyptians as 'the thigh'.

If the reader can bear some other words, I propose to consider a few which are important in other ways. I beg to refer again to the work of Wallis Budge which is becoming rather familiar to us now,<sup>7</sup> since I have cited it so frequently in recent pages. The reader must realize that we are nearing the end of the matter and summon his last reserves of patience for the final trudge across meroglyphic soil, craggy though it may be.

In Wallis Budge, then,<sup>8</sup> we find a passage from one of the Pyramid Texts where Osiris is described in his role of husband of Sothis (Sirius) and implored 'Be not wroth in thy name of Tchenteru'. This plaintive plea must be examined. What on earth is so terrible about this 'Tchenteru'? Well, to begin an explanation, the word tchentch means 'wrath, anger'. So that is obviously the meaning of the word. But we have to continue to pursue this.

Shortly afterwards in the same Pyramid Text we read of the birth of Horus, the son of Osiris, by Sothis: 'Horus-Sept [Horus-Sirius] cometh forth from thee in the form of "Horus, dweller in Sept [Sirius]" Thou makest him to have a spirit in his name of "Spirit, dweller in Tchenteru".'

Well! Here we have an interesting new light on this Tchenteru which seemed so important for no reason which was immediately apparent. It is something to do with Sirius. What, then? Obviously the close association of the place Tchenteru and the Sirius system led me to investigate the word and its related forms.

I found that tchentha means 'throne'. I found that tchenht means 'beam (of a ship)'—second significant meaning. And I discovered a third. Namely, that tchens means 'weight, heavy'. This was just too much to be coincidence. We first have the Sirius system described as being the place Tchenteru and then discover that that word in related forms means three strictly Sirius-related things: 'throne', 'beam of a ship' and 'weight, heavy'. Tchenteru is 'the place of weight or heaviness' and is identified by the Egyptians with the

Sirius system' I also discovered that Tchenit is a two-headed god (later this name became one of the seventy five names of Ra and lost its original importance) Now a two-headed god with each head representing one orbit and having fifty eyes, gives us a hundred-eyed god, and the hundred-eyed monster of the Greeks was Argus

Wallis Budge says another form of tchens, 'weight', is tens, which also means 'weight, heavy' And the very next word in the giant dictionary is teng which means 'dwarf' We thus see an apparent variation of the same word meaning 'heavy' and 'dwarf' and this word is specifically applied to the Sirius system

But just in case there are any sceptics left (and there always are), a look at the Egyptian word shenit will be helpful This word means 'the divine court of Osiris' The same word shenit means 'circle, circuit', and shenit means 'a circuiting, a going round, revolution' Shenu means 'circuit, circle, periphery, circumference

orbit, revolution', and there is a specific  expression written

which Wallis Budge gives, and which means 'the two circuits' and twice fifty is a hundred, giving us the Great Year Shenu means 'the Great Circle' or 'the circuit of the Great Circle' or the islands of Shenu, which last is interesting in that it indicates that this place of the Great Circle is not only 'the divine court of Osiris', who is the husband of Sothis (Sirius), but is also a place with islands (stars or planets) where one can presumably live It does seem that the Egyptians had quite as clear a conception of the Sirius system as the Dogon

have

The verb shenu means 'to go round, to encircle', but the verb shen means 'to hover over' and presumably the great orbit is above us in the sky, hovering over us in space

The Egyptian word khemut means 'hot parching winds, the khamasin, or khamsin, i.e. 'winds of the "fifty" hot days' This is rather interesting \* In late times 'the dog days' about the time of the rising of Sirius and called 'dog days from the Dog Star' were supposed to be hot and scorching There are many references to this in writers like Pliny and Virgil Here is an earlier tradition of hot days incorporating the Sirian number fifty This same word khemut has familiar meanings in its related forms Khemut-urtu means 'the stars that rest not' Khemut-hepu means 'a class of stars' Khemut-hemu also means 'a class of stars' In short, khemut means 'stars' So khem (though apparently not used on its own in surviving texts) really means 'star', as well as referring to fifty days. Khem also has the meanings 'shrine, holy of holies, sanctuary', and 'little, small', also 'he whose name is unknown, i.e. 'God', also 'god of procreation and generative power', also 'to be hot', and 'unknown' All these meanings are relevant to the Sirius mysteries The Sirius system was held to be the source of generative and procreative power as we have already seen, Sirius B was of course 'unknown', and was 'little, small', and was a star that rests not (that is,

it is always orbiting, which is not at all usual for a star. And what is a star that rests not unless it be Sirius B? For only the planets, which were well known and differentiated by the ancient Egyptians, rested not with the remarkable

Arabic khamshin, fifty and Hebrew khamshin, fifty', are obviously derived from this Egyptian

## THE RISING OF 'SERPENT'S TOOTH'

.83

exception of Sirius B. Comets and meteors apart, and they too were well classed to themselves

There is a Hymn to Osiris preserved on a stele in the Bibliothèque Nationale, Paris, which dates from the XVIIIth Dynasty around 1500 B.C. and which we find in Wallis Budge. We find khem used in this interesting hymn in the following

passage:9

This passage is extremely interesting because of the recurrent theme of 'thrones' (which word as a proper noun in the singular is the name of Isis) as applied to the celestial region of Osiris which, as we know, is the Sirius system. Of course, in the superficial view this passage may seem merely to describe some vague kind of reference to a great god who is in the sky somewhere or other, and has a heavenly throne and has a lot of stars twinkling here and there around him for added glamour. But a close inspection of the way things are said here won't let that kind of interpretation stand up. Apart from the fact that the Egyptians were incredibly precise in what they said, what is said in the texts is what is said in the texts. One cannot just gloss over inconvenient precise statements which seem unintelligible and tempt one to brush them aside in order to 'get on with it'. In the above passage describing the khem or stars, we find them associated with, indeed identified with, thrones, which are quite separate from the throne of Osiris himself. Now this is precisely equivalent to the description of the throne of Anu and the thrones of the Anunnaki which surround it, as we meet in Sumer. And here too the context is both celestial and related to Sirius. And here too the thrones are stars which never rest which could be a description of the movement of Sirius B, with the familiar meaning of each year's 'step' in the orbit equated with a 'throne'. All that is lacking here is their number of fifty.

The same word, khemut, however, refers to fifty days, and to Sirius! We therefore have the one remaining ingredient

There is another Egyptian word which can shed some light on our subject. A possible explanation of serpent's teeth and their springing up as soldiers may result from a pun on the Egyptian word menu. This word means both 'soldier' and to plough, to till the earth, to cultivate. A combination of the two meanings yields the strange idea of soldiers resulting from ploughing. And

in the Jason story, Jason has to yoke the bulls and plough the field only after which can he sow the serpent's teeth. Anyone who has read the Argonautica will know this. Jason didn't just walk into some field, throw some serpent's teeth about like birdseed, stand back and presto! He had to plough the field. He had to practise men in order to produce men.



Now we must turn our attention to the mysterious Egyptian word tcham. A general meaning of tcham is 'sceptre', possibly because the meaning of tcham in Anpu is the name of the magical sceptre of Anpu (Anubis).

Tchamtu are 'bowmen' and Sirius is the Bow Star, as we know. Now, the really intriguing meaning of tcham is 'a kind of precious metal'. There are various expressions in the literature such as 'the finest tcham', 'real Cham' and 'Cham from the hill-top'. The impression one gets is that this Cham is a pretty special commodity. Presumably Anubis's sceptre, which is the Cham sceptre, is made of this Cham material. A sceptre is an object which exercises rule and force. The fact that there is 'Cham from the hill-top' could either have a mundane meaning to the effect that the stuff is a metal mined in the hills or more likely is connected with Anubis, not only through his sceptre, but through the hilltop as the residence of the god in the ziggurat sense such as one finds in Sumer. For Anubis was known as 'Anubis of the hill'.

In Wallis Budge we find more information from Pyramid Texts about Cham. The references are entirely stellar. There is a description of the deceased Pharaoh, in this case Pepi I. Pepi's father is Tem 'the great god of An' (Heliopolis) and the first living Man-god 'the creator of heaven and earth'. In Sumer too the great god of An was the creator of heaven and earth, but there was not, as far as we know, a city named after him as was the Egyptian city of An which came to be known to the Greeks as Heliopolis.

Of Pepi we read in the text that 'the appearance of this god in heaven, which is like unto the appearance of Tem in heaven'. This is a gross flattery typical for the texts mourning the dead Pharaohs. Every Pharaoh looks like the great god of An and every other great god and does every conceivable

celestial thing The Pharaoh is dead, long live the Pharaoh!

Now various gods, including the Governor of the Land of the Bow and Sept (Sirius) 'under his trees', carry a ladder for Pepi. Pepi then appeareth on the two thighs of Isis, Pepi reposes on the two thighs of Nephthys. Tern puts Pepi at the head of all the gods, and Pepi setteth out in his boat with Horus. He then stands among the imperishable stars, which stand up on their Cham sceptres, and support themselves on their staves. This seems to make clear that the metal Cham is also a specifically stellar material which supports the stars!\*

Then we read 11 'Thus Pepi liveth life more than your sceptres au. The word au al. means 'dog, jackal', and I suspect a connection with 'dog star' and Anubis who is jackal/dog. Also the au t en athen is the au t of the sun, or 'the course of the sun'. But, to resume:

O ye gods of the Sky, ye imperishable ones, who sail over the Land of Tehenu [the Tehenu are 'the sparkling gods, the stellar luminaries' from tehen which means 'to sparkle, to scintillate'] in your boats, and direct them with your sceptres, thus Pepi directeth his boat with you by means of the uas sceptre [Uasar is a variant form of Asar, the name of Osiris, and uas-t is 'a kind of animal, dog (?)' 12] and the Cham sceptre, and he is fourth with you [indicating that he joins a group of three stars!]. O ye gods of

The Greeks had a tradition of the strongest metal and called it adamant. Kronos used it to castrate Ouranos (Uranus); mythically it was the strongest metal.

## THE RISING OF 'SERPENT'S TOOTH'

.85

heaven, ye imperishable ones, who sail over the Land of Tahennu, who transport yourselves by means of your sceptres, thus Pepi transporteth himself with you by means of the uas and Cham, and he is the fourth with you. Thus Pepi is the anes matter which cometh forth from Nephthys. Pepi is a star. Pepi is Sept, under his sebt trees. The star Septet (Sothis) graspeth the hand of Pepi. Pepi plougheth the earth. Osiris [Pepi is addressed by the name], thou art the double of all the gods [Uas is also the Egyptian name of Thebes.]

Here we see the dead Pharaoh Pepi's celestial after-death experiences described. He goes to the stellar regions and joins three stars, becoming 'the fourth'. He uses three sceptres for power, the al. (similar to a word for dog/jackal), the was (also the name of Thebes, similar to another word for dog, and related to a variant form of the name of Osiris) and the Cham (a mysterious metal and the sceptre of the dog/jackal-headed god Anubis). The star Sirius is specifically described as taking his hand. Pepi himself is transformed into a star, as clearly stated 'Pepi is a star'. He becomes a star and his hand is taken

by the star Sirius, which can only mean that he becomes a star in the Sirius system, and he 'becomes fourth with them'. He then is identified in turn with the three other stars of the Sirius system, which are Isis-Sothis, Nephtys, and Osiris. The first emits 'anes matter', the second is the female Nephtys, which may be identical with the ('female Sorgho' or Sirius C of the Dogon (though sometimes Nephtys refers to Sirius B in other contexts), and the third is called 'the double of all the gods' being the circling companion and the archetypal double of many figures from Isis to Gilgamesh. This is quite obviously Sirius B.

And there is Cham, the mysterious, potent stellar 'metal' which is said to be the power of Anubis, whom we have earlier identified as the personification of the orbit of Sirius B. And Cham is quite similar to the word we dealt with earlier, tchens, meaning 'weight', and its related forms tens 'heavy, weight', tensmen 'to be heavy' and the similar word teng 'dwarf'. If we spoke of something described only by a series of these apparently related words, namely tchens fens teng Cham, the meaning would be, quite literally, allowing for the absence of proper grammar, 'the weight (of) heavy dwarf star-metal', remembering that Cham is also specifically identified as the power of the god Anubis whom we have identified previously as the orbit of Sirius B: the dwarf star composed of super-heavy 'star metal'.

Concerning this star-metal, it is as well to take notice that in "Isis and Osiris" (376 B), Plutarch says of the Egyptians: "Moreover they call the lodestone the bone of Horus, and iron the bone of Typhon, as Manetho records (Manetho fragment 77). Recall that the bones of Earth' in ancient tradition are stones. It is interesting that a heavy metal is the bone' of Typhon which we have earlier determined as a description of Sirius B. And magnetized iron or lodestone is the bone of Horus, the son of Isis and Osiris. This is exactly the sort of tradition one would expect.

We must recall that Anubis is our form of writing the actual Egyptian word Anp or Anpu. The verb anp means 'to wrap around' obviously connected with Anubis's role as sacred embalmer. It is significant that Anp hem is 'a jackal'.

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.86

## THE SIRIUS MYSTERY

headed god who guarded the river of fire, a form of Anubis'. We have already postulated that 'the river of fire' may be a way of describing the orbit of the star Sirius B, so it is quite interesting to see that Anubis, whom we have already identified as representing the orbit, is specifically said to be the guardian of the same river of fire. And 'wrap around' could have an orbital meaning as well as its obvious meaning of 'swathe'.

We recall that a special description of tcham given in Wallis Budge's Dictionary 14 was tcham from the hill top. Also we have just equated tcham with Anubis. So it should not surprise us that a title of Anubis is Tepi tu-f 'he who is on his hill'. As I mentioned a moment ago, this seems to be a ziggurat concept such as one finds in Mesopotamia. The tepi complex of words is quite interesting and bears examination.

Tepi means 'the foremost point of the bows of the ship, the hindmost part of the stern' - extremely specific and exactly fitting my specification of what was important about the ship Argo. Tepi also means 'the first day of a period of time', and I maintained earlier that the tip of the prow and the tip of the stern of Argo (with fifty oar places between them) was a symbol of the orbit of Sirius B. Also we will recall that arqi means 'the last day of a period of time'. So any period of time has a first day called tepi and a last day called arqi in Egyptian. And tepi describes the Argo just as arqi is the origin of the very word Argo. And Tepi is part of a crucial descriptive title of Anubis whom I have equated with the Argo. There is even a further connection between tepi and the Sirius-complex. The word tep ra means 'the base of a triangle' and the words septa and septch both mean 'triangle'. Septit is Sirius and the triangle is its hieroglyph.

The basic meaning of tep is 'mouth' (hence the meaning tep ra sebex '"crocodile's mouth" - a disease of the eye') and even more fundamentally 'beginning or commencement of anything'. It is interesting for the study of concepts of geometry to note that the Egyptians thought of the base of a triangle as its 'mouth' or beginning.

Now, the link-up which takes place between arqi and tepi - that is, the end of a cycle and the beginning of the next - could lead to some confusion without much trouble. If the last day of the old cycle is the arqi and the first day of the new cycle is the tepi, it would be easy to begin to think of the arqi as the beginning - after all, it and the tepi are adjoining each other and amount to practically the same thing. In a sense one could say that the true end of a cycle is the beginning of the next. For us, New Year's Day is represented by a combination of an old man with a sickle or scythe walking away and a baby representing the New Year. The two figures are together. Similarly, the arqi and the tepi are inescapable companions. As time passed and traditions decayed a bit, it must have been an easy thing to think of arqi as the actual beginning of a new cycle, since it was the end of the old. And it is thus which I presume happened in Greek, for the verb arkomai means 'one must begin' or 'one must make a beginning'. And it is related to arche, which means 'beginning, starting point' etc., and which survives in our architecture and archetype. So here is further evidence that the 'ark' words in the Indo-European languages derived from the Egyptian arq words.

Another link of the 'ark' words complex with the Argonaut story is found

## THE RISING OF 'SERPENT'S TOOTH'

in a strange place. One of the most peculiar of all treatises to survive from ancient times is the curious *Of the Names of Rivers and Mountains and of such Things as are to be found therein*.<sup>15</sup> This treatise survived in the corpus of Plutarch's writings but is obviously not by him. In fact, the treatise strikes me as basically a wild satire on a type of writing which was then common. One of the rivers discussed in this treatise is the Phasis, up which Jason sailed to Aea in Colchis. Of this river we read 'It was formerly called Arcturus'. Without elaborating on this point, I merely wish to note that the very river at Colchis once may have had a name which may be related to the 'ark' word complex. Arcturus supposedly means 'bear-ward', referring to the ward of the bear known to us as Ursa Major, the Big Dipper. Arcturus in Bootes is conceived of as its companion according to Allen, who says it had connections with Osiris and possibly Horus. This is probably another of the many confusions arising from companions who are compared to each other. But as I said, I do not wish to be led astray by elaborating on the question of the name Arcturus and all that that would involve. I merely note the fact that the Phasis was once the Arcturus and leave it at that.

The name Phasis had connections with birds, such as with an expression 'the Phasian bird'. Recall the *kirke* or *Circe* connections with Colchis. It is interesting then to note that the *phassa* in Greek is 'the ringdove'. Forms of this word refer to doves and doves, are, as we have seen previously, intimately associated with omphalos-oracle centres marked out from Behdet. And we know that Aea in Colchis, which is on the River Phasis and has such associations with the Argo and the oracles, is related to doves in this way and also because of the doves let fly from the arks and Argo. So the fact that Phasis and *phassa* are connected is no surprise. This river, whether named Phasis or Arcturus, seems to be aptly designated. It is also to be noted that in Greek a *phasso-phonos* or 'dove-killer' is the name of a kind of hawk. And *kirke* is likewise!

Before leaving Plutarch behind, we might note also that in *Isis and Osiris* he tells us that a name for Osiris was *Omphis*. An interesting tie-in with the oracles, attested by Plutarch as current in Egypt in his day.

To return to *tepi*, we note that *tepi ra* means not only 'the base of a triangle' but 'divine oracle', which is also quite relevant. I have postulated that the oracles are connected with the Argo as representative of the orbit of Sirius B, the beginning of which I designate by *tepi*, and we discover that the name in Egyptian for 'oracle' is *tepi ra*.

*Tepi ra* became the word for 'ancestors', due to the connection of *tepi* with the beginnings of things. And the *tepi an-qerr-en-pet* were the ancestor-gods of the circle of the sky, which is again significant. Visitors, perhaps?

Gods of the circle in the sky seem to be referred to by Plutarch's account of the Persian religion in *Isis and Osiris* (370 A.B.). As many people know, the



Persian religion prior to Islam was Zoroastrianism, which survives today as the religion of the Parsees of Bombay in India, to which city they fled from their Persian home, and when it was being conquered by the Moslem invaders. The Persians are not Semitic Arabs but are Indo-European, with a language and original religion closely related to the Aryan Indians and to Sanskrit. In fact, the earliest form of Sanskrit, which is called Vedic, is very little different from the earliest form of Persian, which is called Avestan.

Zoroaster (also known as Zarathushtra) is known to have postulated two basic divine principles: Ahura Mazda the principle of light and goodness, and Ahriman the principle of evil and darkness. These two principles are also known by the names of Oromazes and Areimanius, which are the names used for them in Plutarch's treatise. If we recall Plutarch's description, cited by us earlier, that Anubis was the circle dividing the light from the dark in Egyptian religion, it will be interesting to note that in 369 E.F. he equates with this concept, by describing it in similar terms, the Persian god Mithras who mediates between the darkness and the light. Then in 370 we find this remarkable passage: '(The Persians) also tell many fabulous stories about their gods, such, for example, as the following: Oromazes, born from the purest light, and Areimanius, born from the darkness, are constantly at war with each other; and Oromazes created six gods, the first of Good Thought, the second of Truth, the third of Order, and, of the rest, one of Wisdom, one of Wealth, and one the Artificer of Pleasure in what is Honourable. But Areimanius created rivals, as it were, equal to these in number.' These twelve gods would seem to be zodiacal. But it is the following passage, immediately after this, which becomes really interesting: 'Then Oromazes enlarged himself to thrice his former size, and removed himself as far distant from the Sun as the Sun is distant from the Earth, and adorned the heavens with stars. One star he set there before all others as a guardian and watchman, the Dog star. Twenty-four other gods he created and placed in an egg. But those created by Areimanius, who were equal in number to the others, pierced through the egg and made their way inside; hence evils are now combined with good.' A footnote to the Loeb edition adds: 'It is plain that the two sets of gods became intermingled, but whether the bad gods got in or the good gods got out is not clear from the text.'

This passage is really deserving of some attention. We find a quite specific description of all this taking place in a region meant to be distinct from our solar system. The Persians seem to have quite clearly understood the fixed stars to have been beyond the system of the sun. This, at least, is what they seem to be trying to convey: a distinction of locale. In any case, the light god Oromazes and the dark god Areimanius each create twenty-five gods, which gives fifty. And they are placed in an egg, which is an elliptical shape just as in an orbit. One of the twenty-five gods created by Oromazes is by a slight garbling said to be Sirius, but in any case, there were created by Oromazes the Dog Star Sirius plus twenty-four other gods which makes twenty-five and a

corresponding twenty five created by Areimanus and they mingle in the shape of an egg. What does that sound like ? And Sirius is specifically stated to be the chief one. And as Areimanus was the 'dark' god and his creations were 'dark', then his creation in opposition to Sirius would be a 'dark' Sirius, wouldn't it? And as for the fifty gods arrayed round Sirius (speaking strictly from this text one would have to say the forty-nine gods arrayed around Sirius, but I speak of garbling of the tradition because, from what we already know from other such descriptions from elsewhere, Sirius should really be the fifty first element) they obviously represent the fifty years of the orbit of Sirius B in an egg shape around the Dog Star as its 'guardian and watchman'.

There are further examples of a wavering between forty-nine and fifty in the ancient traditions. Graves has these interesting remarks 16. Chief priestesses

## THE RISING OF 'SERPENT'S TOOTH'

.89

were chosen by a foot race (the origin of the Olympic Games), run at the end of the fifty months, or of forty-nine in alternate years. Apart from the fact that Graves here speaks of 'the fifty months' as antecedent to the Olympiads, a point which we discussed much earlier, we see the alternative use of forty-nine and fifty as a quantitative time measurement. This is rather like the shilly-shallying between forty-nine and fifty in the above Persian description. There is also this example from the Bible, in Leviticus 25, 8-13:

You shall count seven sabbaths of years, that is seven times seven years, forty-nine years, and in the seventh month on the tenth day of the month, on the Day of Atonement, you shall send the ram's horn round. You shall send it through all your land to sound a blast, and so you shall hallow the fiftieth year and proclaim liberation in the land for all its inhabitants. You shall make this your year of jubilee. Every man of you shall return to his patrimony, every man to his family. The fiftieth year shall be your jubilee. You shall not sow, and you shall not harvest the self-sown crop, nor shall you gather in the grapes from the unpruned vines, because it is a jubilee, to be kept holy by you. You shall eat the produce direct from the land.

The above words and many which follow them, but which I will not quote (as anyone can refer to the Bible for the full account), were spoken by God to Moses on Mount Sinai and are Jehovah's directions as to what the Israelites must do. It is even more significant that Jehovah is made to say much later in the same speech, all of which has been devoted to his talk of his fifty-year jubilee and what must be done about it by the Israelites. '...for it is to me that the Israelites are slaves, my slaves whom I brought out of Egypt. I am the Lord your God. Remember that Egypt as the source of the Sirius tradition had had 'brought out' of it the Sirius mysteries and traditions by Danaos to Argos, etc. It seems the Israelites too are part of this, though there will probably not be a single rabbi unshaken by such a suggestion.

What, then, of the forty-nine versus the fifty? Perhaps for explanation we should return to Robert Aitken's book *The Binary Stars*.<sup>17</sup> In discussing the length of time of the orbit of Sirius B around Sirius A he says: "Thus, Volet's orbit, computed in 1931, which differs very little from my own, published in 1938, has the revolution period 49.94, whereas Auwers gave 49.42 years' the point being that the orbit of Sirius B takes between forty-nine and fifty years and is somewhat less than fifty."

The Aitken book also firmly informs us that the orbit is an ellipse, as are the orbits of all heavenly bodies. But of course when speaking generally of the orbit of Sirius B one does not say 'the ellipse', one says 'the circle'. We say in common parlance: 'The planets circle round the sun,' even though we know their orbits are elliptical. And most mentions of the orbit of Sirius B in our sources are to 'the circle'. But, naturally, the Dogon draw a specific ellipse in the sand to represent the orbit of Digitaria (Sirius B). Figure 6 clearly compares the Dogon tribal diagram of the orbit of Sirius B around Sirius A with a modern astronomical diagram of the same.

We have already seen near the beginning of the book how the Dogon not only know that the orbit of Sirius B around Sirius A is an ellipse, but they also

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.90

## THE SIRIUS MYSTERY

know the astounding principle of elliptical orbits whereby that body around which the orbit takes place inevitably tends to be at one of the two foci of the ellipse. For the Dogon specifically say: 'Sirius is one of the centres of the orbit of a tiny star Digitaria'. Kepler first formulated this principle as a law of planetary motion – a revolutionary step forward in Western science. The Dogon also describe the orbit of the Star of Women (a planet around Sirius C) as forming an ellipse with Sirius G at one of the centres.

Now, in light of the dithering over forty-nine and fifty just referred to, and the references to seven times seven equals forty-nine, seen in the light of the fact that the orbital period of Sirius B is between forty-nine and fifty years, which can be well accommodated as Graves says of the Sacred Year, fifty months, or of forty-nine in alternate years – thereby balancing out to a close approximation to reality by alternating the count successively as fifty years, then forty-nine years, then fifty years – etc., one can understand why the orbit of Sirius B around Sirius A is 'counted twice to be a hundred years', as the Dogon say and as was done in Egypt and in Greece, and which led to the double Sacred Year of one hundred and the Greek goddess Hekate which means 'one hundred' and the hundred-handed ones of Greek mythology, etc. It was because orbits of Sirius B had to be counted in pairs in order better to

approximate a whole number. And the fact that this was the case among the Dogon and the people of the Mediterranean area seems to confirm beyond all doubt that the Sirius tradition of the Dogon is a survival of the Mediterranean (namely, Egyptian) tradition brought by the ancestors of the Dogon from the Garamantes Kingdom of Libya where it had been taken by the Minyan immigrants.

It is also significant and conclusive that the Dogon specifically say 'The period of the orbiting of Digharia is about fifty years and corresponds with the first seven reigns of seven years each of the first seven chiefs. And, This rule was in operation for forty-nine years for the first seven chiefs who thus nourished the star and enabled the star to periodically renew the world. But, the eighth chief having discovered the star, etc., combining also the sacrifice of the sacred chief concept emphasized over and over by Graves in his many references to the Sacred Year of fifty months. This passage from Graue's account of what the Dogon told him almost reads like a straight quotation from the Book of Leviticus in the Bible. Or from The Greek Myths by Graves! Can there be any further doubt that the two traditions are identical? That the Dogon brought it from the Mediterranean world into an obscure wilderness area where it has survived the ravages of time and empire amazingly intact and specific? And that the Mediterranean tradition in turn really was about Sirius and the orbit of Sirius B, the great invisible?

The Dogon tribe are really the last of the Argonauts, from whom they are quite literally descended - being Minyans in the middle of West Africa.

Turning to the Egyptian word henti, one finds that it is a name for Osiris and it also is 'a crocodile-headed god in the Taat, which is the Egyptian underworld, and it also means simply crocodile gods.

Hent is specifically 'the crocodile of Set', hen-t is, interestingly, a specific locality of the underworld and means 'a district in the Taat'. But, more widely, hen-t is 'a mythological locality' which is not necessarily in the underworld.

## THE RISING OF 'SERPENT'S TOOTH'

191

It would seem that the fabulous Hen-t was a locality which had an underworld counterpart and obviously is somehow connected closely with both Osiris and crocodiles.

The name of this region, Hen-t, when taken as a common noun rather than as a name, means 'dual'. This is a strong clue as to the nature of the fabulous region. A region intimately connected with Osiris and whose name means 'dual' is reminiscent of Plutarch's description of that circle or ellipse with its dual aspect of separating the light from the darkness. Lest the reader think this far-fetched I must hasten to add a further meaning of hen-t which is 'border, boundary' and another which is 'the two ends of heaven' which all appear to refer to a circle and have the hen-t ('dual') nature of outside and

inside and the two extremes connected by a diameter Hen-t also means 'end, limit', and a hentu is a specific period of time lasting for 120 years. Remember that the Signu of the Dogon was every sixty years and two Dogon Signu make one Egyptian hentu. In fact, a hen-t hentu would be a Signu or, perhaps, vice versa, depending upon one's grammatical preference. (The use of the word 'dual' can be rather ambivalent and be construed as either halving or doubling by the context.) And this dual time period is also rather like the two fifty month periods which make the hundred month period of that sacred Great Year connected with Sirius, which has a dual aspect.

Hentu also has the meaning 'endless' and the endless circling of Sirius B around Sirius A could be referred to here. Some such idea must be at work, otherwise how can the same word have the meaning of 'endless' and also of '120 years'? It must be a reference to an endless cycling of perhaps the orbit of Sirius B or of the Signu cycle's own basis. In any case, it signifies that the 120-year period was arrived at as an endlessly recurring cycle, and for that to have been the case, the 120-year period must have been quite important, which is exactly what one would anticipate. In Appendix III there is an explanation proposed for the true nature of the Signu and of the hentu based on certain astronomical facts.

Considering that hentu means all this and also means 'crocodile gods, etc.', it is surprising to see that hennu means 'to plough' and a hennu is 'a ploughman'. One immediately thinks of Jason ploughing the field for the dragon's (crocodile's?) teeth. It may well be that the serpent's teeth motif which was a pun for 'the goddess Sirius' was extended in another layer of pun to 'dragon's teeth' as a reference to crocodiles.

In connection with Sirius B being the hairy, bestial Enkidu figure, we see with interest that hen means 'to behave in a beast-like manner' and a hentu is also specifically 'a beast-like person'. In addition to hentu being a name for Osiris, who is the companion of Sirius, we find it describing 'a beast-like person who is the archetypal companion in Sirius-related legends'. And additionally we find Hathor the cow goddess, a form of Isis-Sirius, referred to as Hennu-Nefert. (Nefert simply means 'beautiful'.) But this word hennu with the double 'n' has the basic meaning of 'phallus' and has a phallic determinative hieroglyph, and therefore may not be related to the hen words with a single 'n'.

Hen-ta significantly means 'grain' in keeping with the Dogon concept of Sirius B being a grain. Ham means the hawk god Seker and his henu boat. This boat (echoes of celestial Argo) is the sacred boat of Seker, the Death god.

of Memphis'. This reminds us of the Circe-complex and the death god of Colchis. It must be emphasized that the hawk and the falcon are constantly being

confused with each other not only in Egyptian studies, but I have asked falconers the difference between a hawk and a falcon and they vaguely suggest a difference in colour of eyes and that the falcon tends to be smallish. A hawk supposedly has golden eyes (solar ?) whereas the falcon has brown eyes. But their habits are not identical and as there are various species of both hawk and falcon, confusion reigns supreme. The hawk and falcon do not seem to have been distinguished by the ancient peoples, or at least less so than the crocus and the co.chicum (or 'meadow saffron'). Of course the differences were recognized in practice, but what we must realize is that in the ancient world the Aristotelian structure of genus and species for plants and animals did not obtain, and differentiation in linguistic or semantic terms did not resolve to so fine a focus. For such precision one would employ qualifying adjectives, but a systematic modern biological terminology did not exist. Hence we found much earlier that *kirke* in Greek meant 'a hawk or falcon'. In short, they are as interchangeable at the level of terminology as the 'L' and the 'R' were interchangeable in Egyptian at the level of pronunciation and symbol. It seems the Egyptians, like the Chinese of the present day with their 'fried lice' for 'fried rice', had a paralipsis and inability to differentiate the two liquid sounds. Indeed, the 'L' could be differentiated further if our ears were so trained. It is possible to pronounce a much more lingual and less dental 'L' than we use in English. But as for the French 'r', I confess to being as unable to form my tongue to pronounce that sound as Aristotle was, for instance, unable to pronounce the Greek 'rho' thus being considered by the Greeks to be a lisp. 8

However, I have let myself digress. The subject of hawks and falcons can, it seems, be pursued to a resolution. Seton Gordon, probably the world's expert on the golden eagle, could not tell me a conclusive differentiation between them. Nor could an experienced falconer friend. I was becoming impatient at this lack of an answer until I learned from my friend Robin Baring, who had once considered becoming an ornithologist, that an extremely subtle difference between the hawk and the falcon does actually exist. According to him, on a hawk, the fourth or fifth pinion feather is longer making a rounded wing, whereas on a falcon, the second or third wing feather is longest making a pointed wing. I am not certain whether this is fully comprehensive to all the many species. In *A Glossary of Greek Birds*, 19 D'Arcy Thompson says that the ancient Greek poet Callimachus (who was quite a scholarly gent) claimed there were ten species of hawks, and Aristotle claimed Egyptian ones were smaller than Greek ones. It looks as if people have been trying to sort out hawks and falcons since the Creation. But if the reader is as weary of these birds as the author, let us agree to drop them and face the last few remaining Egyptian words. We have survived a waterfall, can we muster the strength to pull ourselves to shore?

*Hensekti* means 'hairy one' and also Isis and Nephtys. Nephtys could be identified with Sirius B who is the archetypal 'hairy one' but it seems more likely that Nephtys varied between being a name of Sirius B and being a name of Sirius C, the female star which was also invisible. The *hemmemet* arc, tantalizingly, 'men and women of a bygone age'. The meaning to plough of

## THE RISING OF 'SERPENT'S TOOTH'

.93

and 'boundary' of hen-t are linked through 'arable land' of henb-t in the word hen-b which means 'to delimit, to measure land, to make a frontier boundary' (This seems to connect the single 'n' words with the double 'n' words after all.) Thus, further possibilities for punning between a reference to the delimiting orbit of Sirius B and 'ploughing' in connection with the ploughing of the ground for the sowing of the serpent's teeth – serpent's teeth being a pun on the goddess Sirius, as we know. Hence a series of dizzying puns all interlocking.

Just for final measure we note that Hen-b is also a serpent god of the Tuat and Henb-Requ is a jackal-god, bringing us into liaison with the jackal/dog Anubis and Sirius B's orbit and adding as a final flourish yet another pun on serpent.

We recall that the throne and the oar were the two most common allusions to the yearly 'steps' in the fifty year orbit of Sirius B. Also the name of the goddess Isis, which in Egyptian is Ast, means 'throne' and is represented by the hieroglyph of a throne. Significantly then, as-ti using the same hieroglyph of the throne, means one in the place of another, successor. This is a specific reference to the sequentially of the thrones. And the orbit which they represent also known as Anubis, seems to be given specific recognition by the combined form Ast Anpt, which is Isis-Anubis.

Another name for Isis as Sirius specifically is Aakhu-t. In the light of this new name it is not surprising to learn that Aakhu-t is 'the god who dwelleth in the horizon'. And aakhu-t sheta-t means 'the secret horizon'. Aakhu-t are 'the two spirits, i.e. Isis and Nephthys'. And the aakhu-t are also 'the uraei on the royal crown', etc. – demonstrating the origin of the most central of the Pharaonic insigniae. Hence yet further demonstration of the connection of the Sirius system with 'the secret horizon' of Sirius B's orbit and its profound importance to the Egyptians.

Another form of the name of Isis, Ast, is Aas-t, which is seen as significant if we note that aasten means 'one of the eight ape-gods of the company of Thoth'. He presided over the seven. For this is a parallel to the Sirius-linked story of the Dogon, whereby the eighth chief presided over the previous seven chiefs as a means of signifying the orbital period of Sirius B commencing again with the advent of the eighth chief following the seven chiefs, each with a reign of seven years giving seven times seven or forty-nine years. This Sirius concept is here referred to in another form of the very name in Egyptian for Isis, who was identified with Sirius.

Another way of referring to Isis and to Nephthys is as Aar-ti, 'the two Uraei goddesses, Isis and Nephthys'. There is an intimately related form of this word.

Aararut, which probably is the origin of the Sumerian goddess Aruru's name. For she was the counterpart of Isis in Sumer and was known also as Ninnursag, Nintu, Ninmah, etc. It is specifically in her name of Aruru that she creates the hairy Enkidu, companion to Gilgamesh. No doubt because Enkidu is related to Sirius B, she appears in this name in the Epic of Gilgamesh because this particular name is closely related to the Sirius lore, through its derivation from this Egyptian form. And the fact that Aar-tu is a common name of both Isis and Nephtys, and Nephtys is more closely connected with the companion of Sirius, the appellation Arum is closer to Sirius B, who is also represented by

194

## THE SIRIUS MYSTERY

Enkidu, than another name for the goddess Sirius which was not specifically shared with Nephtys, the dark companion. This word also means 'uraei' and we have just seen that the other word for the uraei is related to the horizon of Sirius B's orbit, as well as also being shared with Isis and Nephtys, obviously shared because the orbit described by one is described around the other, and as we have seen several times, the orbit was common to them both and divided their respective precincts. Therefore words connected with this orbit must be common to them both. And what more appropriate name for the Sumerians to use for the goddess in her role as creator of Enkidu, the dark companion of Gilgamesh, than a name derived from this aspect of the goddess?

Sirius the Dog Star is represented by the hieroglyph of a tooth, so it is important also to know that there is a word in Egyptian which means both 'tooth' and 'dog'. I am referring to shaar, 'tooth', and sha 'a kind of dog', sha-t 'female dog', shai 'a dog-god', and Shaait which is a form of Hathor who is identified with Isis.

Also sha-t means 'one hundred' and is the Egyptian synonym for the Greek Hekate.

Another word for 'tooth' is abeh, and a related form of the same word means 'jackal'. In addition aba means 'to make strong' and ab-t means 'path'. App means 'to traverse', and dp means 'steps'. If I may be forgiven lack of grammar, app-ab-t-em-ap means 'to traverse a path in steps' which is exactly what Sirius B does in its orbit. Since Anubis has been identified as the orbit of Sirius B, it is not surprising that a title of Anubis was 'the counter of hearts' with 'the counter' being the word api and abu meaning 'hearts'. But if we altered that slightly to api-abt instead of api-abu, the meaning would be 'the counter of months' for abt means 'month'. Another pun with a deeper meaning with reference to the 'hundred months' (or years) 'counted' by Anubis, who is the



orbit, as he traverses his ab-t em ap, his 'path in steps

To go on examining the Egyptian language would be superfluous to our present intentions. So would a continued elucidation of Sumerian religious names from Egyptian. But it would be just as well to fill in a bit of information on that transition which brought our Mediterranean Sirius tradition south from Libya to the Niger River. Herodotus told us how the Garamantes of Libya had been pushed further and further westwards and southwards. Graves says they were forced down to the Fezzan in the desert regions of south Libya. We find a further account in A History of West Africa by J. D. Fage 20

Herodotus, writing about 450 B.C., speaks of the Garamantes, that is the people of the oasis of Djerma in the Fezzan (who in modern terms would be accounted Tuareg), raiding the Ethiopians - i.e. black skinned peoples, across the Sahara in two-wheeled chariots each drawn by four horses. About 400 years later, another great early geographer, Strabo, says much the same of the Pharusii of the western Sahara, who may perhaps be equated with ancestors of the Sanhaja. The chariots of the Garamantes and Pharusii were very light fighting vehicles, unsuitable for carrying trade goods, but it is a point of considerable interest that Herodotus's and Strabo's accounts of their activities have been confirmed and given added point by the discovery on rocks in the Sahara of some hundreds of crude drawings or

## THE RISING OF 'SERPENT'S TOOTH

.95

engravings of two-wheeled vehicles each drawn by four horses. The most significant aspect of these drawings is that they are almost all distributed along only two routes across the Sahara, a western one from southern Morocco towards the Upper Niger, and a central one running from the Fezzan to the eastern side of the Niger bend.

In The White Goddess, Robert Graves says also of the Garamantes 21

Herodotus was right in stating on the authority of the Egyptian priests that the black dove and oracular oak cults of Zeus at Ammon in the Libyan desert and of Zeus at Dodona were coeval. Professor Flinders Petrie postulates a sacred league between Libya and the Greek mainland well back into the third millennium B.C. The Ammon oak was in the care of the tribe of Garamantes - the Greeks knew of their ancestor Garamas as the first of men. The Zetas of Ammon was a sort of Hercules with a ram's head akin to ram-headed Osiris, and to Amen-Ra, the ram-headed Sun-god of Egyptian Thebes from where Herodotus says that the black doves flew to Ammon and Dodona.

In his fascinating book Lost Worlds of Africa, 22 James Wellard in Book Three, 'The People of the Chariots', discussed the Garamantes and related topics at

some length. One of the most amazing elements in the story concerns an apparently lost civilization sitting under the sands of the Sahara which once was the centre of the Garamanian empire, and which was dispersed by the Moslem Arab invaders. Wellard describes this civilization in suitably mysterious terms:

On the track which runs across the desert from Sebha, the modern capital of the Fezzan, to the oasis of Ghat on the Algerian border, the traveller crosses an underground water system that has few parallels for ingenuity and effort in African history. Seen from inside, the main tunnels are at least ten feet high and twelve feet wide and have been hacked out of the limestone rock by rough tools, with no attempt to smooth the surface of the roof and walls. How many of them actually remain is still not certain, though hundreds of them are still visible. In places they run less than twenty feet apart and their average length, from the cliffs where they originate to the oases where they terminate, is three miles. If we assume from the 230 that remain visible that there may have been as many as 300 of them in this region of the desert, we have - taking into account the lateral shafts, nearly 1,000 miles of tunnels hewn out of the rock under the desert floor.

We are still not clear as to how the system worked. First, where is the entrance to these tunnels? One can spend hours trying to find their inlet, and though the solution would seem easy at first, assuming that a particular mound is followed along its entire length, the investigator finally arrives at a jumble of rocks at the base of the escarpment without being able to tell where the tunnel has disappeared to. (the system possibly) presupposes an adequate and regular rainfall in which case we have to go back as far as 3000 B.C. to find such a maritime climate in the Sahara Desert. Could the foggaras be that old? Wells are the only water sources in the

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.96

## THE SIRIUS MYSTERY

Wadi el Ajal today, and they are adequate for the present population of some 7 000 people. If we compare this figure with the 100,000 or more graves so far found in the Wadi and dating from the time of the 'people of the water tunnels', we can get some idea of how populous this region was. In addition, the construction of such an enormous hydraulic complex indicates an industrious and technologically advanced people who had reached a stage of culture superior to that of northern Europe before the Roman conquest.

We can, therefore, safely assume that (a) between 5000 and 1000 B.C. a cattle-raising and agricultural people belonging to the Negro race had

occupied large areas of the Sahara Desert which they kept habitable and fertile by means of the foggaras, and (b) it was precisely the prosperity of these defenceless Africans that incited the white settlers along the Libyan coast to invade the Fezzan. These immigrants (originally, it seems, having come to Africa from Asia Minor) were the Garamantes, the people of the four horse chariots first mentioned by Herodotus, who describes them as already a very great nation in his time. They thereupon appear and disappear throughout the classical period until, around a.d. 700, they vanish altogether as the last of their kings was led away to captivity by the Arab invaders of the Fezzan. Their Saharan empire had lasted over a thousand years.

Yet we know almost next to nothing about the Garamantes, and the reason is obvious: with the fall of the Roman Empire, Africa became a 'lost' continent, so much so that no European traveller reached even as far south as the Fezzan until the beginning of the nineteenth century.

I should add that it was the Emperor Justinian who destroyed North African civilization, before the Moslems came.

Welard also says that in the Garamantuan territory are myriads of tombs, pyramids, fortresses, and abandoned cities lying untouched by any archaeologist's spade. For instance, he visited the fortress city of Sharaba which lies out there in the desert gradually sinking beneath the sand. In the first place, perhaps not more than a few score European travellers have visited the site in any case, as it lies off the caravan routes in one of the more inaccessible pockets of the Mourzouk Sand Sea. In point of fact, archaeological research in the country of the Fezzan has only just begun.

After the Arab conquest of the Garamantuan empire, the survivors fled south-west and 'fused' with the Negro aboriginals on the south bank of the Upper Niger and adopted their language, as Graves tells us in *The Greek Myths*,<sup>23</sup> and as he learned from the books of the anthropologist Eva Meyrowitz.<sup>24</sup>

So that is some more light on how the Dogon and related Negro tribes of the Upper Niger came to possess their amazing information. It is a tale of thousands of years, and the drama was enacted across thousands of miles, which only seems suitable considering the nature of the message they were to carry into a much different world—the global village of twentieth-century culture. According to the Dogon, the shaper of the world visited the earth and returned to the Sirius system, having given men culture. Now that our race has set foot on another heavenly body and we are looking outward to our

## THE RISING OF 'SERPENT'S TOOTH'

197

solar system, we are prepared to give serious consideration to any neighbours

who might be within a few light years of us and have solar systems of their own which they inhabit and where they pursue their lives with the same desire to know, to learn to understand, and above all to build a genuine ethical civilization, that motivates the best of us. For if they are not so motivated it is doubtful that they will have survived their own technologies. In love one can live, but without love there is no world that will not poison itself. One must assume that any creatures living at Sirius will have come to terms with a wholesome and vital ethic. If Sirius is indeed the home of a 'shaper of the world', then it may encourage us, too, to become shapers of worlds.

## Notes

1. Griaule and Dieterlen, *Le Renard Pale*, op. cit. p. 44. 'The establishment of categories, of classifications, of correspondences, constitutes an armature comparable to the framework of a construction, to the articulated bone structure of a body. What imparts life to them gives them their own physiology. As, for the Dogon, their relationship with God and with the order in the world he created, that is to say, with the way the universe was organized and functions today.

'It is the myth that lights up the whole. Structures appear progressively in time and are superimposed, each one with its own special meaning, also with its own interrelations which are narrowly connected. That is what lends meaning to the succession of categories and stages of classification, which give evidence of the relationships established between man and what is not of man in the universe.

For a more complete account of how the armature of symbolic interrelationships extends even to the smallest daily action or object for the Dogon, one should read the entire section 'The Thought of the Dogon', pp. 40-50, in *Le Renard Pale*. This section expresses quite well the mentality required to function within a society grounded in reality at all levels. The one drawback to such patterns of thought is that they can ossify if over-elaborated as a baroque maze, and stultify free inquiry, as happened in the Middle Ages in Europe when the Church had the answer to anything and anyone who disagreed could go fetch his rope and stake, make a bonfire, and commit himself to his divinity. There are dangers to anything, no system of thinking is perfect. Only the constant unremitting exercise of a free will and attention can regulate that most ill-regulated of organisms, the human personality, and keep it on course. 'Systems' all are panaceas, whether of thought or society, and all equally useless to the nonvigilant individual. The doctrine of the mean expressed in all sound philosophies is the doctrine of exercise of the attention at all times, the high-wire performer is the archetype of the successful man. (Successful not in terms of bank accounts, must I add?)

2. Wallis Budge, Sir E. A., *Osiris and the Egyptian Resurrection*, 2 vols., London, 1911, Vol. II, pp. 294-5.

3. *Ibid.*, Vol. I, p. 156.

4. *Ibid.*, Vol. I, pp. 389-90.

5. Plutarch, op. cit. This essay in vol. discussed in my Appendix IV.

6 Ibid , Vol I, pp. 106-7

7 Osiris, op cit , Vol I, p. 93

8 Ibid

9 Gods of the Egyptians, op. cit , Vol II, p. 164

10 Osiris, op. cit , Vol II, p. 311

11 Ibid Vol II, p. 341

12 See Wallis Budge, Sir E. A. , An Egyptian Hieroglyphic Dictionary, London, 1920

13 See Note 6

14 See Note 12

15 In Vol V of Goodwin's trans. (ed.) of Plutarch's Morals, 1874, op.cit

16 Greek Myths, op. cit 60.3

17 The Binary Stars, p. 938

198

## THE SIRIUS MYSTERY

18 What is so odd about the Chinese inability to distinguish the two liquids is that they have both of them more or less in their own languages. For the L is quite common and a sound rather close to an V is used in words which we commonly transcribe by a 'J', such as in the word jen, which is pronounced almost like 'run' in English and is the Confucian term for virtue.

19 Op cit , p. 65 under hierax

20 Fage, J. D. A History of West Africa, Cambridge University Press, 1969 pp. 14-16.

21 Op cit , p. 182 (Chapter Ten under 'D' for Duir')

22 Wellard, James. Lost Worlds of Africa, Hutchinson, London, 1967 also reprinted by The Travel Book Club, London, 1967

23 Op cit , 3.3

24 See Notes 13 and 14 to previous chapter

## SUMMARY

In ancient Egyptian, the hieroglyph and word for 'goddess' also means 'serpent'. The hieroglyph for Sirius also means 'tooth'. Hence 'serpent's tooth' is a pun on the goddess Sirius. In the Argo story, Jason sowed the 'serpent's teeth', an idea which must originally have stemmed from this Egyptian pun. The Greek word for 'the rising of a star' also refers to 'the growing of teeth from the gum'. Therefore when the serpent's teeth were sown in the ground, they grew up from it as from a gum – that is, the star Sirius ('serpent's tooth') rose over the horizon.

Thus we see the mythological code language of sacred puns in operation. Behind the myths lay concealed meanings which are decipherable by returning to the hieroglyphics and finding synonyms which form puns.

We find explanations of the words Argo, Ark, Argos, etc. by looking for Egyptian origins. These words derive from the Egyptian word *arg*. But related words in Greek give clues as well. Argus was a dog connected with a cycle. Another Argus had one hundred eyes and watched over Io, who is connected with the Sirius traditions and Isis. The Egyptian word *arg* refers to an end of a cycle, represented in the Odyssey by Argus. The Egyptian word *arg* refers to a circular concept and is the origin of the Latin *arcere* and of our arc.

A temple of Isis found in southern Italy has in its inner sanctum a painting of hundred-eyed Argus (portrayed, however, with a normal face and eyes). The mysteries of Isis were celebrated in this inner sanctum. Also the fifty daughters of Danaos traditionally brought from Egypt to Greece (and hence southern Italy) the mysteries of the Thesmophoria which according to Plutarch were Isis mysteries. So we see Isis connected intimately at the most secret and sacred levels with 'fifty' and one hundred (Hekate) and Isis was identified with Sirius.

The earliest Egyptians believed Sirius was the home of departed souls, which the Dogon also believe. The Egyptians said that when a deceased spirit 'went to Nephthys' he revolved 'in the horizon' and revolves like the sun. This is a pretty specific description of the dark Nephthys as a 'sun' revolving around Sirius.

The Egyptians also maintained that emanations from the region of Sirius vivified creatures on Earth. This, too, is believed by the Dogon.

Since the Egyptians believed Sirius was the other world of departed souls, it is interesting that they called 'the other world' *arg-heht*, using the familiar word *arg* again.

In Egyptian the region of Sirius is described by a word meaning also 'throne' and 'weight' and similar to a word meaning 'dwarf'.

The Egyptian word meaning 'fifty' (from which are derived the Arabic and Hebrew words meaning 'fifty') referred to the fifty hot 'Dog Days' of Sirius and also to a star that rests not – obviously a moving star, namely Sirius B with its fifty year orbit.

## THE RISING OF 'SERPENT'S TOOTH'

.99

Sirius in Egypt is 'the Bow Star' The Egyptian word for 'bowman' refers also to a heavy star metal connected with Anubis (which we have previously suggested refers to the orbit of Sirius B, which is, after all, made of heavy star metal') The word for heavy star metal is similar to the words for dwarf and weight

The Egyptian word for 'the beginning of a cycle' (which would join up with arq meaning 'the end of a cycle') means also 'oracle' and 'the front and hind tips of a ship' a vindication of my oracle- Argo. The same word also means 'the base of a triangle' (and the word for 'triangle' is a variation of the name for Sirius, whose hieroglyph is a triangle) We also have geodetic triangles, connected with the ark, from Thebes and Bendat

Plutarch gives an account of a Persian description of the Dog Star Sirius, which is said to be surrounded by fifty gods forming the shape of an egg (elliptical orbit) in which the 'light god' faces the 'dark god'

In the Biblical Book of Leviticus, Moses commands the Hebrews to observe a Jubilee every fifty years, but I have never heard of their doing so. Obviously the Hebrews did not understand the fifty-year orbit of Sirius B which Moses (who was an initiate of Egypt and 'raised by Pharaoh') presumably had in mind.

In Egyptian the word for 'the secret horizon' also means 'the two spirits' namely, the light Isis and the dark Nephthys. The same word also means 'the god who dwelleth in the horizon' and Isis as Sirius'. The secret horizon would seem to refer to the orbit of Sirius B in which Sirius B lives

The Egyptian word for 'dog' also means 'tooth' (the triangle hieroglyph meaning 'Sirius and tooth') and also means specifically 'dog-god' and also 'one hundred'

Another Egyptian word meaning 'tooth' means 'to traverse a path in steps' and 'to make strong' and is used in connection with Anubis in such a way that could be 'the counter of months while traversing the path'. A synonym means 'one hundred' and 'Sirius'. We thus have 'counting one hundred months while traversing the Sirius path'. But Anubis who does this is 'a circle'. So we have 'counting one hundred months while traversing the circular Sirius path'. Change months to years (as Moses might have done?) and we have two fifty-year orbital periods of Sirius B.

We see that the ancient Egyptians had the same Sirius tradition which we have encountered from the Dogon tribe in Mali. We know that the Dogon are cultural, and probably also physical, descendants of Lemnian Greeks who claimed descent 'from the Argonauts' went to Libya, migrated westwards as Garamantians (who were described by Herodotus), were driven south, and after many many centuries reached the River Niger in Mali and intermarried with local Negroes.

The Dogon preserve as their most sacred mystery tradition one which was brought

from pre-dynastic Egypt by Danaos to the Greeks who took it to Libya and thence eventually to Mali, and which concerns 'the Sirius mystery' We have thus traced back to pre-dynastic Egypt well before 3000 B C the extraordinary knowledge of the system of the stars Sirius A, Sirius B. and possible Sirius C possessed by the Dogon

We have thus managed to rephrase, if not to answer, the Sirius question It is no longer 'How did the Dogon know these things?' It is now 'How did the pre-dynastic Egyptians before 3200 B C or their (unknown) predecessors know these things?'

What is the answer to the Sirius question ? We do not know But knowing the right questions is essential to an eventual understanding of anything The many investigations which should properly follow upon the asking of the Sirius question may give us more answers than we could at present imagine

Archaeologists have a difficult task trying to explain the many similarities between Sumer and Egypt, indicating some still undiscovered common origin for the two cultures an entirely forgotten civilization whose remains must exist somewhere

But in considering the very origins of the elements of what we can call human civilization on this planet, we should now take fully into account the possibility that primitive

200

## THE SIRIUS MYSTERY

Stone Age men were handed civilization on a platter by visiting extraterrestrial beings, who left traces behind them for us to decipher These traces concerned detailed information about the system of the star Sirius which is only intelligible to a society as technologically advanced as ours today Today was the time when we were meant to discover these coded facts, I feel sure Today is the time we should prepare ourselves to face the inevitable reality that extraterrestrial civilizations exist, and are in all probability far more advanced in culture than we ourselves not to mention in technology which could enable them to travel between the stars'

It may be difficult for us to avoid seriously entertaining that most disturbing and also exciting of notions that intelligent beings from elsewhere in the galaxy have already visited Earth, already know of our existence, may possibly be monitoring us at this moment with a robot probe somewhere in our solar system, and may have the intention of returning in person some day to see how the civilization they established is really getting on.

### A Fable

Once there was a little girl sitting by the seashore Her mother had told her to go and play She watched the waves and thought If only something marvelous would happen to me today" The sun was shining very hot upon the strand



and the girl became drowsy. The sound of the quiet surf was like a lullaby. She began to doze.

Suddenly she awoke. The air was alive with a new coolness, a haze had lifted, everything was startlingly clear to the sight. Far out, she glimpsed a flash in the sea, then another flash, a glint of something in the sun. There it was again—something coming towards the shore and making its way through the waves. It must be a porpoise. The girl was terribly excited. Something was happening to make her day memorable. Now she would not have to sit by the seashore and be bored.

Now that the porpoise was getting nearer, it alarmed the girl. Could it be about to crash against the sand, as she had heard giant whales did from time to time in despair? Was it a dolphin actually intent on self-destruction? The girl ran hurriedly towards the spot which seemed to be the dolphin's objective. She saw its tail fin, quite close, appear for a moment. Some seaweed it seemed to be trailing with it showed through the water. It was a bright, almost shiny porpoise—it was now near the sand—what would it do? She could see it now through the water. It stopped. It seemed to be grovelling in the sand. Its tail spashed up, then down. It remained stationary.

The poor dolphin had crashed into the sand. Full of pity, the girl began to wade out towards it. But it moved away slightly. It wasn't stuck in the sand. It was looking up at her from under the water. What could it be trying to do? The girl went back to the shore. The fish now moved in closer again. From quite near to the fish, a woman put her head above the water. She had silver make-up on her face and eyes that went up. The little girl was worried about the fish. "Have you got hold of the dolphin?" she asked the woman. Just beneath the woman's shoulders there was a noise like a swimming suit strap snapping against her skin. She replied to the girl with a fixed stare and a high wail, which seemed to be a song. She moved towards the girl, her eyes never straying from her. Her eyes were clear blue, like the sky. It was as if there were two holes in her head and you could see the sky through them. Again her swimming suit strap snapped against her. Her eyes were like the hot sun. The girl wanted to go to sleep. The woman's eyes were like the sound of the surf. The girl sat down in the sand and tried to make herself see the woman more clearly. The woman's face appeared to be really silver.

## CHAPTER EIGHT

The woman's chest showed above the water now. Her bosom was bare. Her swimming suit strap must have snapped. The woman's bosom was a beautiful silvery green and shiny in the sun. The woman seemed unable to go any farther. She stared at the girl and remained motionless, except for a slight

swaying to and fro

'Who are you?' asked the girl. 'Have you come from a boat?' The woman gave a long wail, but the expression on her face did not change. Then there was the snapping of the swimsuit again. But this time the girl saw that above the woman's bosom were two long thin slits, which had opened and snapped shut loudly as if they were muscles flexing just under her beautiful sleek collar bones. The woman sturred as if she were resting uncomfortably on a high stool. She looked dissatisfied and, twisting her torso, she leapt forward and fell with a splash in the surf near where the girl sat. She had no legs. It was what the girl had thought was the dolphin. The woman was a mermaid. Her body stretched out long, sleek, shiny in the sun, with the surf rushing up past her and then retreating. She leaned on an elbow and raised her dolphin's tail slightly in the air, then tapped the shallow water and did so several times in the way that the girl herself tapped her fingers on her desk at school sometimes.

The mermaid had no scales like an ordinary fish. Her skin was like that of the dolphins in the aquarium who jumped through hoops. But she was more silvery and more green. And there was a kind of hair streaming down her back like thin seaweed, which looked brown, or silver, or green, or grey, or even black. It was all those colours. And still the mermaid tapped her tail against the surf and stared at the girl. She was very much like a naked woman. She looked like the girl's mother did when she hurried to put on her dressing gown before a bath.

Once again there was the snapping noise, only quieter. The girl saw the long thin slits in the woman's chest open and close instantly. Then the woman made a low, pleasant humming sound and looked sleepy. She leaned forward and an amazing series of clicks and pops were apparently made by her in her throat, which the girl could see constricting and moving.

The girl stood up and said to her, 'I've never seen a mermaid before. Can I tell Mummy?' The mermaid seemed to reply by smacking a fin against her skin somewhere behind her, rocking and making a long, loud hum. She leaned forward more and looked at the girl and her eyes seemed to gloss over and go green. She opened her mouth, little pointed teeth showed in pink gums, and a long whispering sound came out which sounded like the sea at a distance. She then beckoned the girl to her with her arm, and her webbed fingers.

The girl stood in the surf and touched the mermaid. 'You're so soft,' said the girl, 'not like fish are. I mean fish are soft, but you're so smooth.' The girl liked the mermaid. She had never seen anyone so smooth and silvery and beautiful. 'I bet you can swim better than ordinary people. I'm going to run and tell Mummy you're here!' The girl began to walk away. 'You won't go away, will you? Wait here!' And she made every effort to smile and signal her intentions. The woman seemed to nod in agreement. The girl ran quickly, looking back often to see if her mermaid woman would wait for her. The mermaid made no attempt to move, but merely watched the girl.

From a distance the mother could see something lying in the surf, as her

## A FABLE

205

daughter tugged at her skirts excitedly 'It's something from a wreck,' said the mother

'No, Mummy, it's a mermaid!' said the little girl

'Don't be silly darling, mermaids don't really exist. They're just in stories. Now what is it you've found?'

Then suddenly the thing in the surf moved. It was horrible, like a serpent 'Oh! It's alive! It's moving! No!' and she turned and tried to push her little girl back home 'I'm going to get Daddy. He'll know what to do. It may be a creature which is injured. Now come with me.'

But the little girl eluded her and ran towards the sea. 'No, Mummy, it's a mermaid! Come and see.'

Feeling sick in the pit of her stomach and apprehensive, the mother followed her daughter and feebly called after her. The girl quickly reached her friend from the sea, and the mother, seeing her standing beside the moving creature, cried, 'No! Get away! Get away from it!' She then ran and it was a woman and fish, it was! It was silver. It was a mermaid! 'No, darling, no! Get away from it! It's horrible!' Her daughter came to her obediently and the mother stared in disgust and nausea at this awful slimy sea creature with a grotesque human frame grafted on to it - a monster, an abomination. She felt her stomach constrict, she gasped, she bent forward in the thought that she would be sick. 'God!' she gasped 'Go home! Go home!' and pushed her daughter violently to make her run.

'What is it, Mummy?' asked the girl, who was now becoming terrified. 'Mummy!' she cried in alarm. Her mother was choking, eyes bulging, stumbling towards her with her flat palm outstretched to push her away towards home. 'Mummy! Mummy!' They heard a loud splash and turned just in time to see the mermaid slip away effortlessly at lightning speed into the deep water gone instantly from sight.

'Oh God!' said the mother as she clasped her head and fell to her knees on the sand.

'She's gone, Mummy. The mermaid's gone. But you saw her!'

The mother looked at her daughter as if the girl might at any moment herself turn into a mermaid. 'Oh darling, what was it? Tell me it isn't true!' said the mother and put her head down into the hot, sharp sand.

A little story about a child and an adult and their different reactions to a strange intelligent amphibian. To the child it could swim better' and was sl.very and fascinating. To the mother it was repulsive and horrible.

In Appendix II the reader will find in English translation the surviving fragments of the lost Babylonian History written in Greek by a Babylonian priest named Berossus, who seems to have been an acquaintance of Aristotle and drew on his own country's temple archives (which were in cuneiform, of course) to compile the history of his country from original documents. The readership would have been the cosmopolitan inhabitants of the Hellenistic world created by the conquests of Alexander.

In his work, Berossus describes his country's tradition of the origins of its civilization. And the tale is a strange one. For a group of alien amphibious beings were credited by the Babylonians with having founded their civilization.

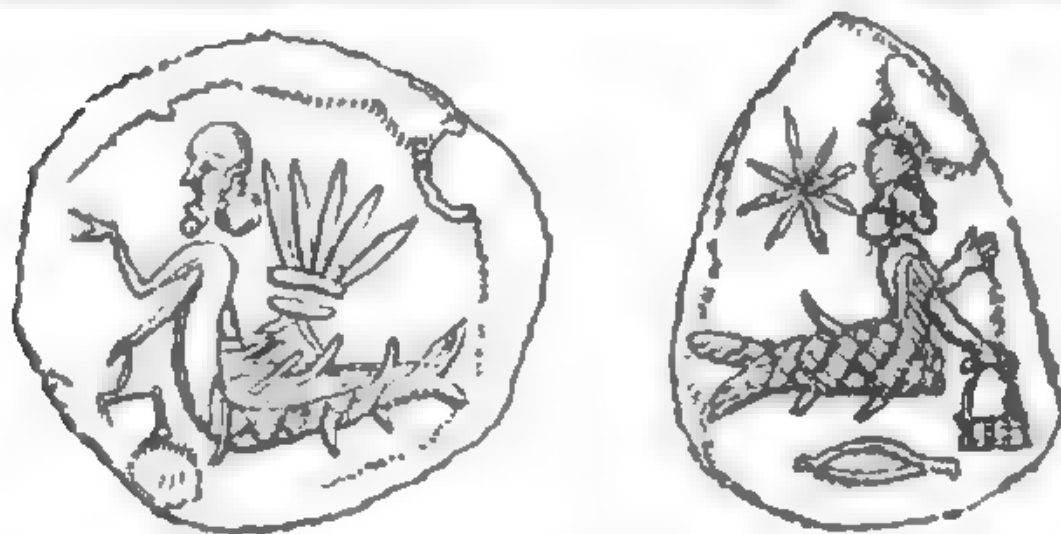


Figure 90. Fish-tailed Oannes on gems in the British Museum. The representation on the right shows a star and eye of Oiris - an Egyptian hieroglyph on a Babylonian gem.





**Figure 31** Fish-tailed Oannes from Assyrian cylinder seal. He stands before an omphalos stone covered in gemstone mesh with descending scales on either side of it. The eye star is above and a 'mouth of Neith' is in lower left.

The main individual of the group of amphibians is called Oannes. We have had occasion to refer to him earlier. There are several illustrations of him throughout this book (Plates 6, 7, 8 and 9 and Figures 30 and 31). In somewhat later traditions than the ones Berossus drew on, Oannes became the fish god of the Philistines known as Dagon and familiar to many readers of the Bible. By that time Oannes, as Dagon, had become an agricultural deity. In the surviving fragments of Berossus we have no reference to the Philistine tradition, and we shall probably never know whether Berossus mentioned it or not. But in the

Berossus fragments preserved by the historian Apollodorus, we read that 'there appeared another personage from the Erythraean sea like the former, having the same complicated form between a fish and a man, whose name was Odacon'. This seems fairly clearly to be a corrupted form of 'Dagon'. Unless 'Dagon' is a corrupted form of 'Odacon'.<sup>1</sup>

Apollodorus criticizes Abydenus, who was Aristotle's disciple, for not mentioning that there were other amphibious beings besides Oannes himself. He says 'concerning these Abydenus has made no mention'. Apollodorus, therefore, seems to have given Berossus a close attention to detail which Abydenus, for his purposes, neglected. This is an extremely important point, as we shall now see. Berossus, according to the close account of Apollodorus, calls the amphibians by the collective name of 'the Annedoti'. They are described as 'semi daemons', not as gods. For some time I thought that the 'Annedoti' must be a convenient and tradition-sanctioned name for these creatures. I was concerned to have a name for them because, as we learn in a moment, the Dogon tribe claim that amphibious creatures with fishtails founded their civilization too, and that they came from the system of the star Sirius. If there are intelligent creatures living on a planet in the Sirius system, it would seem from all the evidence that they are amphibious, resembling a kind of cross between a man and a dolphin. It is therefore necessary to come up with some name for these creatures if we are to discuss them from time to time.

With this in mind, I suddenly wondered what the word 'Annedotus' which is never translated in the Cory translations of the fragments of Berossus could actually mean. I read once again the fragment of Berossus from the careful Apollodorus and scrutinized the translation of it, which was 'in whose time appeared the Musarus Oannes the Annedotus from the Erythraean sea. The Erythraean sea is that body of water known to the ancients which we today subdivide into the Red Sea, the Persian Gulf, and the Indian Ocean.'

What was meant by the untranslated words 'Musarus' and 'Annedotus'? Strangely enough, until I purchased my own copy of Cory's Ancient Fragments, I had never before noticed that the words 'Musarus' and 'Annedotus' were untranslated. In libraries, with a pressure of time, one tends to overlook these details. I also had overlooked this in the account of Apollodorus quoted by Carl Sagan in his *Intelligent Life in the Universe*.<sup>3</sup> These are all reasons why I felt that I should include as an appendix to this book the complete surviving fragments of Berossus (excluding a couple unrelated to our concerns which may be found in the third and final, 1876 posthumous edition of Cory's book). For unless all of the material is available and easy to hand, one invariably overlooks something and neglects to make the frequent and necessary comparisons which enable one gradually to read between the lines and obtain additional insights.

It so happens that the most frequently cited version of Berossus's account is usually that preserved by Alexander Polyhistor.<sup>4</sup> But that is where problems can begin. For Alexander Polyhistor does not use the words 'annedotus' or 'musarus' in his account. And the version preserved by Abydenus uses the word 'annedotus' only as if it were a proper name: 'in his time a semi-daemon called Annedotus, very like to Oannes, came up a second time from the sea.' As for the word 'musarus', Abydenus does not use it at all.

So I turned to the lexicon to find the meanings of these words. I assumed that Cory would have translated them into English if they had simple and obvious meanings. But to my surprise I found that their meanings were quite simple and specific. A 'musarus' is 'an abomination', and an 'Annedotus' is a 'repulsive one'.

Now the reader may appreciate why I wrote the little fable. For the creatures credited with founding civilization in the Middle East were frankly described by the Babylonians who revered them and built huge statues of them (Plate 9) as being 'repulsive abominations'. If ever anything argued the authenticity of their account, it was this Babylonian tradition that the amphibians to whom they owed everything were disgusting, horrible, and loathsome to look upon. A more normal course for any invented tradition of the origins of civilization would have been to glorify the splendid gods or heroes who

founded it. But instead we find specific descriptions of animals endowed with reason' (Alexander Polyhistor's account) who make their awed and thankful beneficiaries want to be sick with revulsion. And what is more, the tradition admits this freely!

The problem of revulsion is a difficult one. It seems to be partly a result of what we are taught when young. No doubt psychologists would have a great deal more to say about it. But whatever origins it may have, it seems to be almost uncontrollable once a propensity to it has developed. If someone finds snakes or spiders repulsive, it would take a great deal of persuasion to get him to change his attitude, and the chances of success are minimal at best. As humans, we tend to dislike all slimy creatures, creepy-crawling creatures, creatures which ooze or slither or wriggle. Indeed, people who have a pronounced fondness for such creatures often seem to be suffering from a pathological condition themselves. I once knew a girl who kept a pet boa constrictor in her bedroom, next to her bed for 'company'. She fed it a live mouse every Thursday and she loved to watch it being eaten alive. She loved more than anything to hear the snake at night in the dark when it made a curious slithering fall against the side of its tank: this excited her greatly. Now, I do not wish to criticize the girl for her strange tastes but I think most readers will agree that the girl had somehow transformed the interest in a snake into something else. And that kind of substitution is the promotion of a fantasy which can probably be classed as pathological, though possibly not dangerous to anyone (except the mice).

Granted all these circumstances of human relationships to slithery creatures and the problem of revulsion in general, it does strike me as a most superb irony that a race of intelligent beings may really exist in our near neighbourhood of space who are slimy and repulsive, and yet who have founded many of the elements of our own human civilization and have a technology sufficiently advanced to enable them to travel between the stars. Indeed, when all other pleasures in life fail, the one remaining is a delight in irony. I recommend it, both to men and Annedoti.

According to Berossus as preserved by Alexander Polyhistor, the amphibians look like this:

The whole body of the animal was like that of a fish, and had under a fish's head another head, and also feet below: similar to those of a man, subjoined.

## A FABLE

209

to the fish's tail. His voice too, and language, was articulate and human and a representation of him is preserved even to this day. When the sun set, it was the custom of this Being to plunge again into the sea, and abide all night in the deep; for he was amphibious.

Who was Berossus, and how reliable was he? It is best to quote Cory's own preface for the information.

Berossus, a Babylonian, flourished in the reign of Alexander, and lived some time at Athens and according to many wrote his Chaldaean history in the Greek language. As a priest of Belus he possessed every advantage, which the records of the temple and the learning and traditions of the Chaldaeans could afford, and seems to have composed his work with a serious regard for truth. He has sketched his history of the earlier times from the representations on the walls of the temples from written records and traditionary knowledge, he learned several points too well authenticated to be called into question, and correcting the one by the other has produced the strange history before us. The first book of the history opens naturally enough with a description of Babylonia. The second book appears to have comprehended the history of the ante-diluvian world and in this the two first fragments ought to have been inserted.

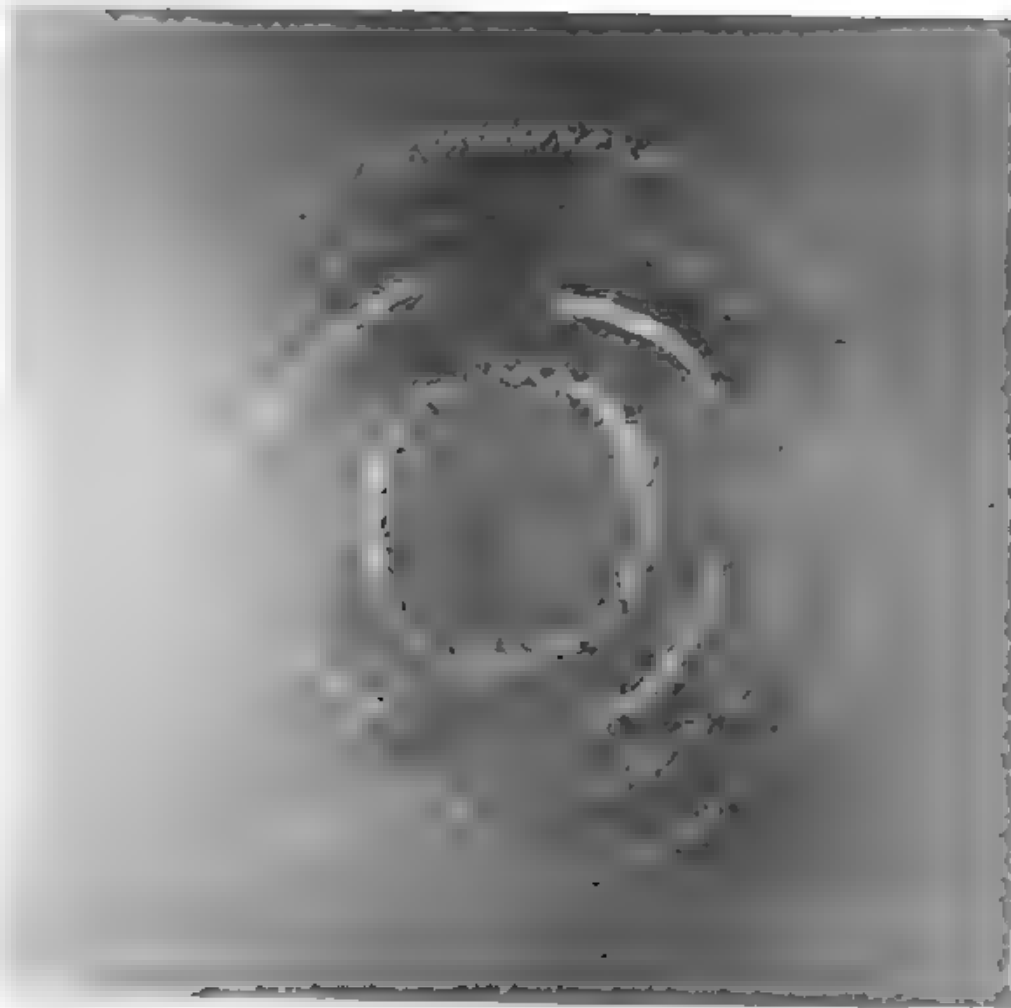
As for two of those later writers who preserve fragments of Berossus, Abydenus the disciple of Aristotle wrote an Assyrian History, now lost, and Megasthenes wrote an Indian History also lost. None of the four writers who have preserved Berossian fragments has had any of his own writings survive intact either. Later writers such as Eusebius, the Christian historian of the fourth century A.D., and Syncellus, the ninth-century A.D. Byzantine historian, have preserved in turn all of the fragments of Berossus which the earlier writers had quoted in their own works. For it seems that the original of Berossus was lost long before the originals of Abydenus, Apollodorus, Megasthenes, and Alexander Polyhistor. And unless some obscure Byzantine monkish library or Egyptian papyrus of Hellenistic date or Babylonian tablet produces new fragments, we may never know more about Berossus than we do now at third hand. But at least my Appendix II should be a help. For it will be the first time since 1876 that the fragments of Berossus will have been published. 5

Let us take a look now at what the Dogon tribe have to tell us about the amphibious creatures who are credited with founding their civilization as well, and who seem to have come from Sirius. In Figures 32 and 34 are Dogon tribal drawings of what the creatures actually looked like. They are credited with having descended in an ark which, in landing, looked like Figure 35 which portrays the spinning or whirling of the descent of the ark. The god of the universe Amma (whose name I feel certain is a survival of that of the god Ammon of the Oasis of Siwa), sent the amphibians to earth. They are called the Nommos. But just as the Babylonians tended to speak of Oannes, the leader, instead of always saying 'the Anmedoti' collectively, the Dogon often just speak of Nommo or 'the Nommo' as an individual. The Nommos are collectively called 'the Masters of the Water' and also 'the Instructors' or 'the Monitors'. They have to live in water. 'The Nommo's scat is in the water.' 6





*Figure 32* Dogon drawing of Nixamo



**Figure 22. Descent of Nommo from the sky. Dogon drawing**

The Dogon describe the sound of the landing of the ark. They say the 'word' of Nommo was cast down by him in the four directions as he descended.\* and it sounded like the echoing of the four large stone blocks being struck with stones by the children, according to special rhythms, in a very small cave near Lake Debo.<sup>8</sup> Presumably a thunderous vibrating sound is what the Dogon are trying to convey. One can imagine standing in the cave and holding one's ears at the noise. The descent of the ark must have sounded like a jet runway at close range.

The landing of the ark is visually described.<sup>9</sup> 'The ark landed on the Fox's dry land and displaced a pile of dust raised by the whirlwind it caused.' For this, see Figure 33. They continue: 'The violence of the impact roughened the ground... it skidded on the ground.'

\* The reader will recall that near the end of Chapter One I mentioned that the word represents a concept like the logos to the Dogon, for it means 'air'. We may take this description to refer not only to noise but to a rushing wind.

The descriptions of the landing of the ark are extremely precise. The ark is said to have landed on the earth to the north-east of Dogon country,<sup>7</sup> which is where the Dogon claim to have come from (originally, before going to Mande) and that is, of course, the direction of Egypt and the Middle East in general.

210

## THE SIRIUS MYSTERY

The latter is much like the Babylonian tradition of their god Ea (Enki to the Sumerians), whose seat was also in the water, and who is sometimes connected with Oannes.

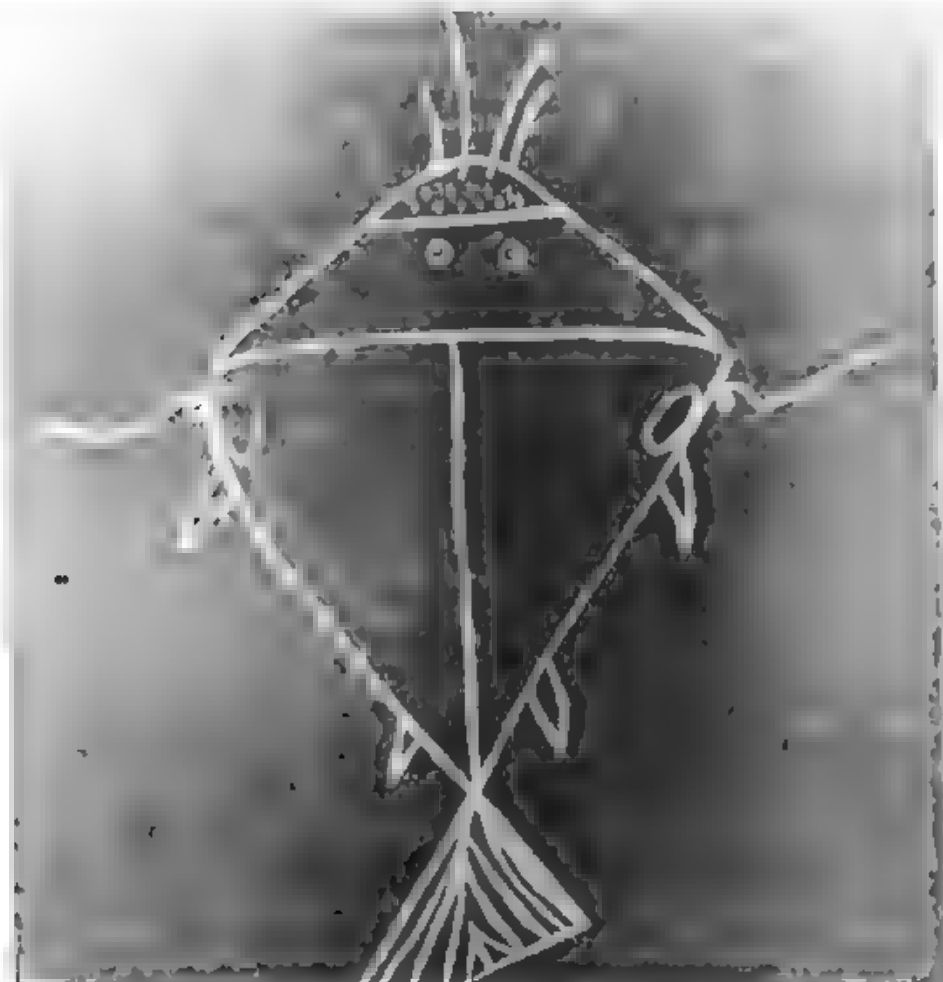
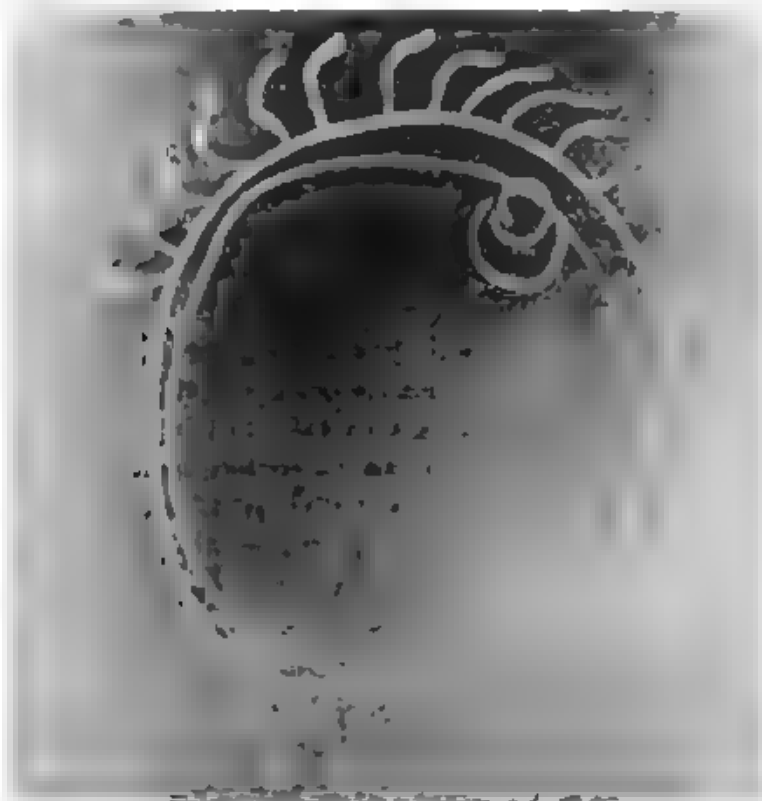




Figure 34. Dogon drawing of Nommo

It is said of Nommo, or more probably of his ark: "He is like a flame that went out when he touched the earth." They say: "The Nommo was 'as red as fire'—when he landed, he became white." <sup>10</sup> And consequently a bit of folk lore: "The albino is the testament on Earth of the Nommo's burns as he came down: he is said to be the 'trace of the burn'—the scar of the Nommo." <sup>11</sup>

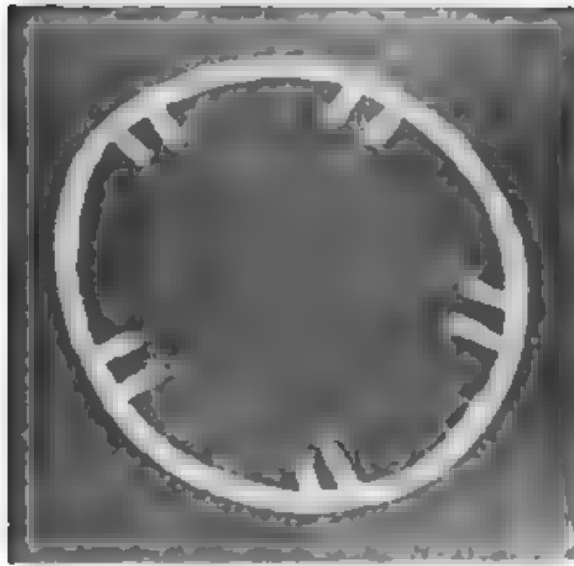
There seems to be a use by the Dogon of 'spouting blood' to describe what we would call 'rocket exhaust.' And let us remember that, short of anti-gravity machines (which may be impossible), rocket propulsion is likely to be used by craft landing on any planet, no matter how sophisticated and non-rocket-like the interstellar main craft, or no matter how immensely advanced the civilization may be which is making a landing on a planet. For the principle of



*Figure 33. The whirling descent of the spaceship of Nommo. Dogon drawing*

the rocket is a simple one unlikely to be dispensed with entirely in any foreseeable future technology. Actually, the Dogon seem to make a clear differentiation between the ark in which the Nommos actually landed on earth and what we may surmise was the true interstellar spaceship hovering above in the sky at a great distance, and which the Dogon seem to describe as appearing in the sky as a new star, and leaving with the Nommos at their departure from Earth. In fact, this is the sort of arrangement one would expect. An interstellar spaceship would probably look like a bright new star, possibly visible in daytime as well as by night, and the landing craft would be simple rocket propelled craft not so different in principle from machines which we use at the present time for landing on the moon.

At this point I should make it clear that I do not believe that spaceships from extraterrestrial civilizations are flitting through the skies at this moment. I am not a 'flying saucer' enthusiast. I do not believe that spacecraft would behave in the erratic fashion in which UFOs behave. It makes no sense to me that spacecraft would fly idly around making spectacles of themselves and ambiguous spectacles at that for years on end. If we went to another inhabited planet, would we waste either time or resources on such apparent nonsense? What seems to be lacking in UFOs is purpose, of any kind, which could conceivably fit into a framework of extraterrestrial visitation. So I therefore do not believe that flying saucers are spacecraft, although I am willing to admit I may be wrong. I have encountered nothing but flak from both sides about this.

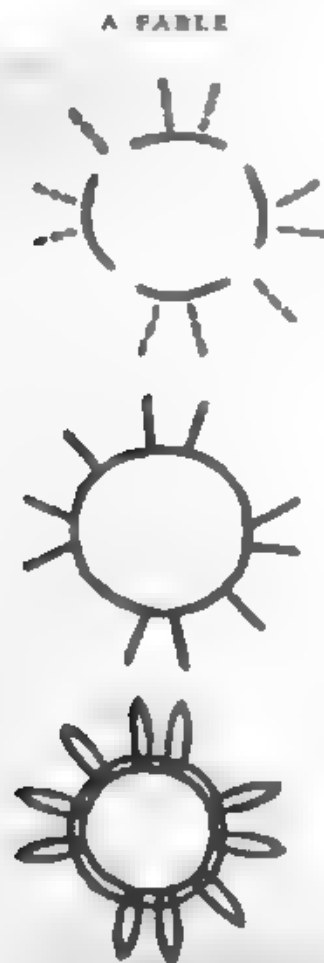


*Figure 36. Dogon drawing of ie pe.u tolo, the ten rays, in pairs, are inside the circle, having not yet 'emerged'*

believers in flying saucers are incredulous that I am not one of them, since I have written a book on extraterrestrials and I even maintain that spaceships visited Earth in the past; those who do not entertain for one moment the notion that spaceships could ever have visited the Earth naturally assume that my book is about flying saucers. I should add, however, that I feel certain that the Earth is being monitored at this moment by a more advanced extraterrestrial civilization, and I assume this monitoring must be by automatic computer probes left behind in this solar system at some time in the past. Although I consider most so-called UFO sightings as pure hysteria or simple error, it is possible that a small percentage of UFOs may be what the devout 'believers' in UFOs claim they are. It is unfortunate that this subject has become so burdened by the oppressive enthusiasm of people whom I can only describe by the unflattering epithet of 'the lunatic fringe'.

The Dogon may describe the interstellar spaceship hovering high above the Earth by what they call ie pe.u tolo, 'star of the tenth moon'. The Dogon say: 'As (the ark) landed, the weight of the ark caused the "blood" to spurt to the sky.'<sup>12</sup> This would seem to be a rocket craft landing on earth. But this 'spurting blood' ('flame') is said to be shared with ie pe.u tolo, and gave the star reality and brilliance.<sup>13</sup> For three different complementary tribal drawings ie pe.u tolo, see Figure 37. These seem to represent the 'star' in three separate conditions, differing in the amount of 'spurting blood' being emitted by the presumed spacecraft. The Dogon also describe this star specifically as having a circle of reddish rays around it, and this circle of rays is 'like a spot spreading but remaining the same size'.<sup>14</sup>

It is said that the Nommos will come again. There will be a 'resurrection' of the Nommo. It should thus not surprise us that 'the celestial symbol of the resurrection is the "star of the tenth moon" ie pelu tolo. This star is not easy to see. The ten rays, placed in pairs, are inside the circle because the star



*Figure 37. Three states of *ie pelu tolo* in the sky. Dogon drawing*

has not yet "emerged" it will be formed when the Nommo's ark descends, for it is also the resurrected Nommo's "eye" symbolically.<sup>15</sup> In other words, the 'star' is not a star, and can only be seen when the Nommo returns and his ark descends to Earth.

The Nommo is the monitor for the universe, the "father" of mankind, guardian of its spiritual principles, dispenser of rain and master of the water

generally '16 Not all the Nommos came to Earth. The 'one' called Nommo Die, or 'Great Nommo' remained in heaven with Amma, and he is his vicar' 17 He manifests himself in the rainbow, which is called path of the Nommo 18 He is guardian of the 'spiritual principles of living creatures on Earth' 19

There are three other distinct kinds of Nommo, each personified as an individual. There is the Nommo Tituyayne messenger (or deputy) of the Nommo Die . he (executes) the latter's great works '20 The Nommos who came to earth in the spaceship are presumably of this class. Figures 3a and 34 represent these beings in particular.

A third class of Nommos are represented by O Nommo, Nommo of the pond' He will be sacrificed for the purification and reorganization of the

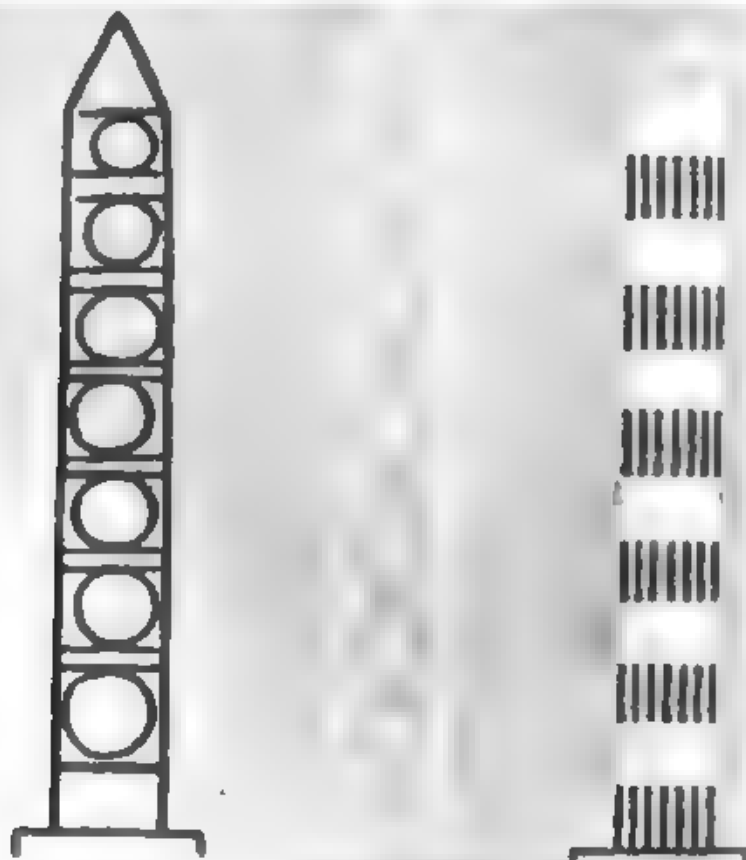


Figure 3a. Singi designs of Dogon

universe. He will rise in human form and descend on Earth, in an ark, with



the ancestors of men then he will take on his original form, will rule from the waters and will give birth to many descendants '21

The fourth Nommo is the naughty disrupter named Ogo, or Nommo Anagonno 'As he was about to be finished (being created) he rebelled against his creator and introduced disorder into the universe Eventually, he will become the Pale Fox (le Renard Pale) which is the image of his fall '22 In many ways, the Fox resembles the Egyptian deity Set

The name Nommo comes from a Dogon word linked to the root nomo, 'to make one drink' It is said 'The Nommo divided his body among men to feed them that is why it is also said that as the universe "had drunk of his body" the Nommo also made men drink He also gave all his life principles to human beings '23 He was crucified on a kilena tree which also died and was resurrected '24

After the ark had landed, according to the Dogon, an interesting series of events took place which make a great deal of sense if one remembers that amphibious creatures were inside Something described both as a 'horse and just simply as a quadruped appeared which pulled the ark with ropes to a hollow '25 'This stage, momentarily, transformed the ark into a chariot drawn

## A FABLE

### 2.7

by a quadruped with ropes '26 The hollow then filled with water However an untoward incident then occurred 'After the first rainfall, when the water had filled the pond, the water-insect entered the water it wanted to "bite" the Nommo's head but it was unable to reach the edge of the ark '27

The bad 'water-insect' was thus unsuccessful in wishing to do harm. When the water filled the pond, the ark floated on it like a huge pirogue

It is said 'The great ark came out of the sky and came down In the centre the Nommo was standing, he came down Then he returned to the water From then on he was called O Nommo, 'Nommo of the pond' through respect men will not utter this name, but will call him instead di tigi, 'master of the water' '28

Thus we see that the second and third categories of Nommo are really the same, but represent successive states And as for the future

His twin who will descend later on with the Blacksmith, 'twin of the victim', will also be transformed in the pond They will have many descendants and will always be present in the fresh 'male' water of the brooks, rivers, ponds and wells and also in the 'female' sea water '29

As for this reference to fresh water as male and sea water as female, it is similar to the ancient Babylonian and Sumerian tradition where Apsu (Abzu) was a

male fresh water deity and Tiamat a female sea water deity. The Dogon say, <sup>30</sup> 'O Nommo has his seat in the waters of the earth' which could just as well be a description of Enki/Ea, whom I mentioned above.

I feel impelled to reproduce in this book as Figure 38 a Dogon drawing showing four variants of the Dogon sirigi mask design. Anyone can see that they look like rocket ships. Griaule and Dieterlen give <sup>31</sup> detailed accounts of the meanings of the lozenges, rectangles, etc. These variant designs are said specifically all to represent the descent and impact of the ark. <sup>32</sup> The descent of the ark was like a lozenge, its impact was like a rectangle. <sup>33</sup> Perhaps this is why the Dogon say: 'When the ark was descending, space was four angles when the ark was down, space had four sides.' <sup>34</sup> The sirigi design itself represents 'a "house with stories"' (and) indicates the ark as well as its descent. <sup>35</sup> So maybe the Dogon have actually drawn a rocket ship.

The Dogon say <sup>36</sup> that 'po tolo (Sirius B) and Sirius were once where the sun now is'. That seems as good a way as any to describe coming to our solar system from the Sirius system, and leaving those stars for our star, the sun. But let us now take leave of our friends the Dogon. Let us go to where Sirius and its white dwarf companion star are the suns, and where our own sun has become just another star in the sky. Let us visit the planet of the amphibians.

What are Sirius and Sirius B like as suns? We know that they revolve around a common centre, which is in fact equivalent to Sirius B revolving around Sirius A in an elliptical orbit. Sirius A, a big, bright star, has two and a half times the mass of our sun. Sirius B has ninety-five per cent of the mass of our sun, but because it is made of degenerate matter and is so tiny, this is not obvious. If Sirius B with its mass were not a white dwarf, we could easily see it from earth as a star of magnitude 2, though the problem of parallax

218

## THE SIRIUS MYSTERY

would make it difficult to separate it from Sirius A. In any case, if Sirius B were on its own somewhere at its distance from earth, and were not a white dwarf, it would be one of the brightest stars in the sky.

In reality, Sirius A is ten thousand times brighter than Sirius B. The luminosity of Sirius A is thirty-five and a half times the luminosity of our sun. That makes it a pretty hot number. We can be certain that our planet is not too near it. The 'habitable zone' discussed in Chapter One is much farther out from Sirius than it is from our sun. As for the actual size of Sirius A, its radius is a little more than one and a half times the sun's radius. This means that Sirius will be smaller in the sky than our own sun, seen from the planet. It will be a good deal smaller, but will need to have roughly the same amount of heat,

which is not too difficult, considering how terribly hot and bright it is. To us it would be a strange experience to see such a small body in the sky giving out so much heat and light. Looking directly at it would probably be as injurious as staring into an arc lamp. All the more reason to be under water, and not so tempted.

Our planet will probably be quite hot. In fact, it will probably even be covered with a vaporous layer of cloud at most or all times. It might look something like Venus from a distance, though of course Venus does not have temperatures or clouds of the sort which living creatures are likely to find agreeable. It would seem important to keep cool on this probably rather hot and steamy planet. Therefore intelligent life is likely to have evolved as amphibious and never have taken to the land. These amphibians might easily inhabit the surface of the water, of course, for they would need to breathe atmosphere and would not have gills like fish. They would probably need to be mammals of some kind in order to develop the brain sizes and other characteristics necessary for intelligence. They would probably spend a lot of time hanging about marshes and might have developed an indigenous way of life originally which involved the use of woven reeds for huts and transport, and so on. (They would long ago have got past that stage, of course.) But perhaps their first style of life, to which they may even look back with some nostalgia as 'the good old days of simplicity and a carefree existence', was something like that described by Wilfred Thesiger in his book *The Marsh Arabs*<sup>37</sup> in which the inhabitants of southern Iraq are pictured in the marshes of the lower Tigris and Euphrates (quite near where Oannes and his friends are said to have spent most of the time, one is tempted to note!)

If you were one of these creatures, you would be a good deal like a dolphin with arms and hands. You would, due to your amphibian nature, have a separate blowhole for breathing in addition to your mouth. You would be able to hold your breath for long periods, and when you did breathe through your blowhole, it would be a gasp and make a bit of noise. Your blowhole would open and close almost instantaneously and your breathing would tend to be infrequent but loud and quick. The blowhole might be placed in such a way that it consisted of one or of two small slits, long and thin, just beneath your clavicles (collarbones). In fact, the Dogon have a tradition that their Nommos breathed through their clavicles.<sup>38</sup>

You could not go about bare-skinned in any atmosphere for long. You would require moisture on your skin after a few hours at the most, when your

## A FABLE

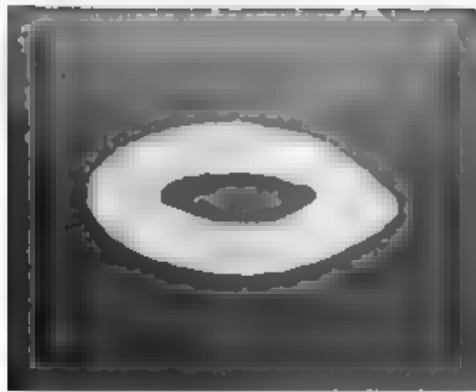


Figure 19 The Nommo breathes through air holes in his clavicles that look like this Dogon drawing

skin dried you would be in absolute agony—worse than a human with sunburn. Because you would frequent the surface of the water a great deal, there would inevitably be a considerable contrast between the top half of your body and the bottom half. The tradition known to us of the mermaid expresses this state of affairs quite well. Your lower extremities would be quite fish-like, but you would have articulate limbs and fingers on your upper half and your skin would be more capable of resisting solar radiations and hence would be more like that of a land mammal. Probably cartilaginous structures would have evolved in your head to rigidify your features beyond the simple streamlined form required for a strictly undersea life, and there would be something on your upper body resembling hair—perhaps like the hair of our own walruses.

Your teeth would probably be feeble compared with those of ferocious carnivores such as sharks. You would probably have evolved from more peaceful creatures capable of feeding on small fish in considerable numbers. Your ancestors would have run in packs as the dolphins do and you would be extremely sociable because you evolved in schools (packs). Nudity is probably the natural state of your species. Overpopulation is not one of your problems because most of your planet is water and all of the water is habitable. Even on the planet Earth, it is estimated that dolphins outnumber human beings two-to-one, and the oceans are hardly overcrowded.

As one of these creatures, you might find human beings repulsive, for many reasons. Their rough hair, dry skins, bony limbs, and particularly their pungent smells might disturb you greatly. Their sweat is not continually washed away in the way that your skin is continually cleansed by the watery medium which you inhabit. And as an amphibian you have exceedingly well-developed senses of smell and taste. You 'taste' smells or spoor-substances underwater at enormous distances and though your sense of smell is not quite as acute, it is competent enough. Unlike yourself, human beings tend to have areas in or near their dwellings which smell of their excrement and urine—places to which they habitually return to perform these functions. As an amphibian whose waste

products dissipate in the water, you find such an idea revolting. How can human beings stand going back to those same odours day after day?

One of the most disturbing sights to you is to watch human beings walking

220

## THE SIRIUS MYSTERY

When humans stand still, with their legs together, they look almost normal. But then suddenly they split into two and begin walking, which makes you slightly dizzy and upsets you. It makes you feel nervous with the thought of how dreadful it would be for you if you split' and thereby became a cripple in the water. You admire the agility of the humans on dry land. They can climb trees and cliffs, all of which is terribly impressive. They can go at a great speed on land with what they call 'running', they even have a certain capacity to jump over obstacles, they are not as swift on land as you are in water, but they do passably well. You do have difficulty in seeing them sometimes because, as you are in a watery environment, your vision is not good at long range. And the humans, being dry, do not stand out against their background as much as you could wish. When they move you can instantly detect motion without optical definition, but a stationary human who is even approximately camouflaged and blends with this background is impossible for you to differentiate with your unaided eye. You rely on your sense of smell, like a rhinoceros. But when the wind is against you, you have no hope. A human can easily elude your perception on dry land if he knows what he is doing and you do not have your goggles or technical aids with you.

You would have an extremely agile mathematical mind. Your ancestors developed from the primitive state by computing the intricate astronomical phenomena and radiations falling on your planet without benefit of direct optical observations. The brains of your species were thus engendered to conceive and solve vast intricate abstractions. Your powers of holding complicated mathematical structures suspended in your mind's eye while performing mathematical operations on them is extraordinary. You have a phenomenal conceptual and generalizing faculty. It is easy for you to conceive of invisible, and even imperceptible, forces, because your daily environment is a suggestive, allusive one. You taste and smell your ambience rather than see it. Your powers of telepathy may be extremely highly evolved, possibly a characteristic of your species from their earliest history.

The climate range of your planet is greater even than the Earth's because there are no ice caps, due to there being more radiation from the two or three stars in your multi-solar system. Your oceans are all the more extensive, therefore, for not being locked up in ice caps at the poles.

Space flight is less uncomfortable for you than for humans, as the state of weightlessness is often approximated under water (indeed, on Earth the astronauts train under water). Your blood circulation is thus better suited to the weightless condition than is the case with humans and you do not at all mind living in the gigantic water tanks orbiting your planet which constitute your many satellite space cities. It is not as difficult to simulate a watery environment in space as it is to simulate a dry land environment. Your wants are few, your existence simple. You do not eat cooked food and you do not have stoves to keep warm. Farming for you is mostly the breeding of delicious small fish, and meals are an adventure as you love a good chase and the satisfaction of catching your food. Dinner is a family sport.

The amphibians must have a name, and the Dogon name for them of 'the Monitors' may be the best to consider using. 'Monitor' is more specific than 'Instructor', and Masters of the Water is too long. There is no point using the

## A FABLE

221

euphemism the 'Annedoti', knowing that it means the Repulsive Ones. A more generic and neutral term, I suppose, would be simply the 'Sirians'. If we ever come into contact with them again, they will probably be called the 'Sirians' officially, and their civilization will be the 'Sirian civilization'. Their art will fall under the heading of 'Sirian culture' and their technology will be 'Sirian technology'. But what about their religion? There's a delicate point. It will be called the 'Sirian religion' and we will try to pretend it has nothing to do with us. But inevitably we will have to take into account that, whereas 'cultures' and 'technologies' can be localized, the greater problems of the nature of life itself and of an individual's relation to the universe—existential problems—are not localizable. There will in fact be no such ultimate thing as 'Sirian religion' except in the ethnographic sense. To speak of a 'Sirian' God will get us into deep waters. What do we mean when we speak of a Jewish God or a 'Christian' God? There is no doubt that it is at the level of our deepest concerns—our religious and philosophical ones—that contact with an extra-terrestrial civilization will make its deepest impact on us. And it is at this friable level of our preconceptions that we are most vulnerable. Here the foundations of our beliefs can crumble with the first shock wave. Here the entire edifice of our civilization can give way. Only by being prepared can we safeguard our own cultural integrity.

We must not dismiss speculations such as those we have just indulged ourselves in as idle, thinking that we will wait and see what turns up in a spaceship some day. If we are going to be coming into direct contact with amphibious extraterrestrials, we should try to get some thoughts together on their physical nature and requirements at the very least—if only to make them welcome. It is quite true, as Carl Sagan says, '... stories like the Oannes legend ... deserve much more critical studies than have been performed heretofore'.<sup>39</sup> The critical studies should be institutionalized by the

governments of the major powers, and made official programmes. The resources of the governments which pour into programmes to prevent their countries being overrun by military invasions, chemical warfare, nuclear blasts, should also pour into programmes to prevent our planet as a whole being overrun by a sudden extraterrestrial contact which gives little warning. No matter how much care may be taken by any superior extraterrestrial civilization in dealing with us, it is really up to us to be ready for any contact. I would even venture that we may be under observation or surveillance at this very moment, with an extraterrestrial civilization based at the Sirius system monitoring our development to see when we will ready ourselves for their contacting us. In other words, we may very possibly be allowed to control the forthcoming contact ourselves. One wonders what any possible amphibious extraterrestrials living at Sirius would think roughly ten years later (speed of radio transmission at speed of light across ten light years means a ten-year lag) upon receiving news from some automatic monitoring device which picked up a radio or television programme at Earth mentioning a book just published about amphibious extraterrestrials living at Sirius. Would they think that was their cue? If what I propose in this book really is true, then am I pulling a cosmic trigger?

When this book was accepted for publication, the managing director of the publishing company asked me to his office for our first meeting. He had per-

---

222

## THE SIRIUS MYSTERY

sonally decided to accept the book and he had himself read it. On this basis his first question to me was, 'Mr Temple, do you believe it? Do you believe it yourself?' My answer was, 'Yes, I do. I have become convinced by my own research. In the beginning I was just investigating. I was sceptical. I was looking for hoaxes, thinking it couldn't be true. But then I began to discover more and more pieces which fit. And the answer is yes, I believe it.'

The information in this book cannot really rest with publication. I hope that many people will take an interest in exploring the ramifications of what I have here presented. This process has already begun, some months before publication. Portions or versions of this book have been read by a number of people already, nearly all of whom have made valuable comments on the material. With a subject like this which is new, fresh insights are possible from almost anyone. The least educated person might have the most profound thought on some aspect of this question. But primarily it is from the highly qualified professionals that progress should come. Astronomers in particular must deal with this material. Fortunately, they are an open-minded community, perhaps due to the open-ended nature of the universe which it is their job to study.

It may be of interest to the reader to see an example of a reaction to this book by an eminent astronomer who is internationally known in his field Professor W. H. McCrea, F.R.S. Emeritus Professor of Astronomy at the University of Sussex and a former President of the Royal Astronomical Society, read an early draft of the book. Though a great deal of the book is changed since then, I nevertheless quote portions of his reactions in a letter to me dated 20 August 1973.

My reaction is

A The special interest of Egyptians and others in Sirius is well known and you have made a strong case (as I think the people you quote have done) for supposing that the Dogon interest in Sirius is connected with this.

B In your very clever investigations of Egyptian, Sumerian, Greek myths, you seem to have shown that some of these people may have had ideas about a dark, dense star possibly associated with Sirius. But, as I say, anything beyond that seems to me not established.

C In spite of all this, if you will allow me to say so, I think your investigations are fascinating and they make an exciting book.

D Your work does appear to bring out more strongly than ever the impression that, as you say, ancient cultures did not develop gradually. I do not know whether this impression is significant, but it bears investigation. I cannot see how it could have anything to do with space travellers. But you may think it right to argue the case. [Unfortunately none of the material in Chapter Eight of this book was known to Dr McCrea when he wrote this, for it was added in a later version of the book, as was much more.]

I may add that I realize that some of the matters about which you write may have been mysteries of religion, and so it may be hopeless to expect anything more explicit than what you describe. Also, as you say, there seems to have been a liking for plans. So it could be that the revelations by the Dogon tell us what has been left secret for 6,000 years. To some

A fable 223

extent, I am being advocatus diaboli so that maybe I am letting you see the sort of thing you will be up against when your work is published.

A great many of the criticisms which I have not quoted were dealt with in the complete rewrite of the book which took place after Professor McCrea and others had kindly blasted me with specific points. I was less fortunate in obtaining such comments from authorities on the ancient world.

On the whole it is the astronomical community who have shown the most interest in this matter, for it is they who are directly concerned with



such a subject. And no astronomer has contributed a more detailed appraisal of the actual Dogon accounts than Dr Irving W. Lindenblad of the U.S. Naval Observatory in Washington, who in a letter to me dated 14 June 1974, made these comments:

I agree that one should think twice before disagreeing with the Dogon. From an astronomical viewpoint, however, there are difficulties with the Dogon's suggestion of a third Sirius component having a period of 32 or 50 yrs. yet having a greater trajectory. Kepler's third law states that the squares of the orbital periods are proportional to the cubes of the orbital semimajor axes. Thus, a greater trajectory must be accompanied by a greater period.

Among the numerous observed triple systems of stars circling a common center of gravity, it has been found that the third member always has a much greater distance and period than the other two components. Celestial mechanics illuminates this phenomenon by demonstrating that a triple system is unstable if the two secondary stars are nearly equidistant from the system's center of gravity.

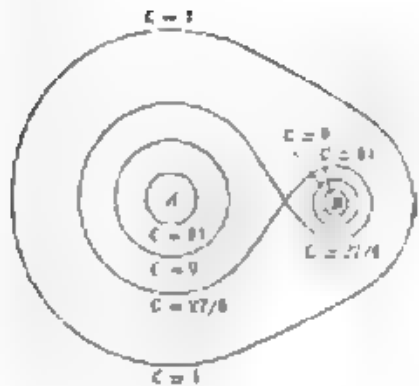
If the periods of B (Digtaria) and C (emmeye) are similar, as stated by the Dogon, their orbits must have similar dimensions (Kepler's Law). But this constitutes an unstable system (celestial mechanics) and it would also contradict the Dogon's thesis that emmeye has a 'greater trajectory'.

The Dogon must have realized that the orbital radii of Digtaria and emmeye could not remain at right angles with one another unless the periods were the same. If he did, this would constitute an argument in favour of accepting the tradition assigning a 50 yr. period to emmeye, as opposed to the tradition assigning a period of 32 years.

As to the diagrams to be found in this book, Figures 6 and 7, showing the comparison between Dogon tribal and modern astronomical conceptions of the relative orbits of Sirius A and Sirius B, Lindenblad, who has been studying the Sirius system for seven years, comments on them in a letter dated 7 March 1974:

'Regarding your orbital diagrams of Sirius, my work would not affect them at all. The changes I have been dealing with involve very minute quantities which can be detected only in large telescopes and even with such instruments a great amount of observation is required.

Dr Lindenblad had not read this book prior to going to press, although he did read the Griauze and Dieterlen account of the Dogon Sirius system and see the diagrams. As for Professor McCrea, he had discovered quite in



**Figure 40** Dr Su Shu Huang's diagram for possible orbits of habitable planet in binary star system. A and B are stars. The curves with different values for C are suggested orbits, one of which is a figure-eight configuration. The most recent suggestion by an astronomer that habitable planets could exist without difficulty in binary or multiple star systems is that of Dr B. M. Oliver "Proximity of Galactic Civilizations" in ICARUS, 25:360-7 (1975), noticed at time of going finally to press.

224

## THE SIRIUS MYSTERY

dependency of my own work that the Dogon knew of the existence of an invisible companion star to Sirius. He was informed of this by a friend in Argentina who had read a French account, which mentioned Griaule and Dieterlen's work. McCrea has spent a considerable amount of time analysing the Dogon tradition, but I leave to him an exposition of his own views when the full material is available to him, which it has not been to date. (Indeed, I received a great deal of it after the book was written and therefore I had to rewrite the book to incorporate it. The new material all served to strengthen rather than weaken my thesis.)

In considering the materia set forth in this book, I hope that serious scholars will bear in mind that the existence of amphibious beings with high intelligence and advanced civilization is not a previously unheard of idea. As far back as 1966, in their book *Intelligence in the Universe*, Roger MacGowan and Frederick Ordway wrote: 40

Little can be said specifically about universal physical characteristics

life, especially the more intelligent forms, tends to be physically small, discrete, and highly mobile. Humans, being land animals, tend to think in terms of land animals when considering intelligence, but we know that the sea contains a great variety of life. Moreover, all evidence points to the conclusion that the primordial seas were probably the site

of the origin of life. Oceans provide an excellent environment for animal life and the competition between many species should encourage rapid evolution.

A liquid environment provides more buoyancy and support for animal bodies than does an atmospheric gas. For this reason the marine environment may be expected to develop many species that are larger than most land animal species. Knowing that larger bodies can support larger brains one might expect to find superior intelligence among the larger marine animals.

Considering this larger potential size, the great variety of life, the good stable environment of the oceans, and the competition among species, one is at first tempted to assume that the majority of intelligent extraterrestrial life would be marine. Fins, ideal for ocean locomotion, are not well suited to developing tools (and thereby brains). However, a few ocean species have developed other appendages more suited to tool manipulation. The octopus is a very well known ocean creature which could conceivably develop tool manipulation capability with further evolution. Some other ocean floor creatures could develop the equivalent of human arms and hands. The potentially high intelligence of certain whales and dolphins raises the question as to whether tool manipulating appendages are really vital to the development of superior intelligence. And it makes it difficult to say whether some intelligent extraterrestrial life may be marine rather than land dwelling. We conclude that the majority of intelligent biological species will not differ greatly in gross morphological characteristics when compared to humans. They can be expected to range from less than half the size of a human to several times larger, and they should be expected to have, in most cases, two legs and two arms with hands and fingers. In a

his diagram showing the general orbits of planets capable of supporting life in binary systems. Notice that one such orbit is a figure-eight exactly of the kind I suggest for Sirius C, with its accompanying planet. However, this kind of orbit would more probably be unstable. It is a possibility, but if it has existed at one stage, it would probably have collapsed into some other configuration after a short time—long before life could have evolved in the Sirius system. Dr. Paul Murdin of the Royal Greenwich Observatory summed the situation up brilliantly when he said that a coin, when tossed, may indeed land on its edge but even if it does, it will soon topple over—so that the probabilities for a tossed coin landing on its edge become meaningless in real situations. Our figure-8 orbit therefore probably cannot exist as a permanently stable feature of the Sirius system, no matter how attractive it may be to us in theory. But my idea of an orbit for Sirius C at right angles to the plane of Sirius B's motion (but

A FABLE

225

few cases centaur-like animals having four legs and two arms with hands and fingers, or elephant-like animals having four legs and one arm or a trunk might be possible. Another possibility is some form of marine life

having fins and two short arms with large hands and webbed fingers

As I remarked in Chapter One and now I mention again, it may well be that Sirius C follows a figure-eight orbit around both Sirius A and Sirius B alternately. Perhaps its total orbital period is 50 years and its larger loop period is 32 years. It may orbit in a plane which is at right angles to the plane of Sirius B's orbit. It would genuinely be a greater trajectory because its figure-eight would encompass both of the other stars, but its actual distance and time would still obey Kepler's third law and would not exceed those of Sirius B with the same period. Indeed, the identity of the periods of Sirius B and Sirius C might be a synchronous phenomenon lending stability to such a complex system. The Dogon seem to claim that the planet on which the amphibians live elliptically orbits the star emme ya, Sirius C. What is required now is a great deal of calculation by a professional astronomer to consider the amount of radiation to which a planet would be exposed following the star Sirius C in a figure-eight orbit of the kind I have proposed. Would life be possible on such a body? The astronomer Su-Shu Huang has written an essay 'Life Supporting Regions in the Vicinity of Binary Systems' which appears in the book *Interstellar Communication*.<sup>41</sup> This essay examines the conditions under which planets supporting life can exist in systems with more than one sun. I reproduce as Figure 40

226

## THE SIRIUS MYSTERY

without the figure-8) was, I was assured by Mardin, probably the ideal solution. For the hypothetical star could penetrate the Sirius B plane of motion in a vast range of places without disrupting Sirius B's orbit, as long as the perpendicularity of the two planes of motion was retained. A 50-year or 32-year elliptical orbit for Sirius C, therefore, in a plane perpendicular to that of Sirius B's orbit is entirely possible. These multiple star motions involve such complicated celestial mechanics that the necessary computations are well beyond the competence of most professional astronomers. Only certain specialist astronomers are capable of such work. Plotings have been made of the possible orbits for third stars in certain binary systems, and at the time of going finally to press, I am seeking the views of R. S. Harrington, S. S. Huang, and D. Lauterborn on these hypothetical problems. Harrington has demonstrated that a triple-star system is stable under conditions where the periastron distance in outer orbit divided by the semi-major axis of inner orbit is not less than 3.5 if the orbit is direct or 2.75 if it is retrograde. Bearing this in mind, Dr Paul Mardin of the Royal Greenwich Observatory concludes: 'There seems no reason to me why there should not be a Sirius C, say another white dwarf, at a distance from Sirius A of four hundred times the radius of our Sun, with orbital plane in the plane of the sky so as not to perturb the radial velocity of Sirius A. And he says that 'its orbit will precess in time due to B, but with a period larger than the period of B so we may be unlucky at this time in not seeing the perturbations. (This refers to Lindenblad's negative results.)

In closing, I wish to make a final point of considerable importance. Let us assume that what I have proposed in this book really is true. Let us grant all the premises. Say that there really is an advanced civilization based at the Sirius system. No doubt we are under routine monitoring. No doubt they know by now roughly where we stand on the ladder of evolution. They have picked up our radio signals. They know we have been to the moon. Let us assume they wish us well. Let us assume even that they contact us some day when they think we are ready for it – or after we have discovered them by examining the Sirius system as I suggest and finding evidences of their existence.

Let us assume all this. Well, if that day comes – or if it doesn't and if some other day comes, some other civilization some day is known to us at some other star – there is one thing we must not forget. We must remember that no matter how grand and glorious they may be, they are still mortal beings in a universe which to them is still mysterious. They cannot and never will know all the answers. We may very well have a handful of answers that they have not. We may have some quirky skills which they cannot attain. We may have some peculiar native ingenuity which they lack, even if this is not obvious for centuries. There may be something about us that is so valuable that we are not just worthless primitives beside them. Let us never accept a view of ourselves as recipients of cosmic charity. We are men, and for all our faults, we have a few things about us which are worth some attention. We have had some remarkable characters in our history and we will have more. Whatever one's views of what lies beyond death – extinction, reincarnation, heaven and hell – the genetic stream goes on. There will be more men, and there will be great ones. We can rise to challenges. We have demonstrated courage throughout our history. Any superior

## A FABLE

227

civilizations may have even more superior civilizations behind them of whom they are curious. Let us not forget the principles of hierarchy, let us never blind ourselves to the possibility of a door behind the door behind the door. And if we ever find ourselves oppressed, let us be certain that there are others – somewhere – who would free us. The universe is finite but unbounded. There are between ten and a hundred million intelligent civilizations in our galaxy alone, in all likelihood. And there is always one more to contact than the one we have already contacted. We can afford to shop around in a shop the size of the universe.

## Notes

1. The reader may wonder if the name of the Dogon tribe is in any way connected with the names Dagon and 'Odacon. This is pure speculation but not unlikely in my opinion.

2. See Appendix II, for reference.

3 With I. S. Shklovskii, Dell, New York, 1966. See Chapter 33.

4 For instance, by Kenneth Demarest in *Consciousness and Reality*, p. 351.

5 See end of Appendix II and the Bibliography. Thomas Stanley in his *The History of the Chaldaic Philosophy* (London, 1662), p. 12, notes some additional interesting information about the family of Berossus by telling us: 'A daughter of this Berossus is mentioned by Justin Martyr, a Babylonian Sibyl, who prophesied at Cumae.' On p. 10 Stanley describes Berossus as the man 'who first introduced Chaldaic learning into Greece.'

6 Le Renard Pale, p. 462.

7 Ibid., p. 458.

8 Ibid., p. 460-9.

10 Ibid., p. 441.

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12 Ibid., p. 440.

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14 Ibid., p. 440.

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16 Ibid., pp. 309-10.

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18 Ibid., pp. 156-60.

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20 Ibid., pp. 156-60.

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22 Ibid., pp. 157-60.

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24 Ibid., p. 287.

25

26 Ibid., pp. 444-5.

27

28 Ibid., pp. 444-5.

29

30 Ibid., p. 506.

31

32 Ibid., p. 438.

33

34 Ibid., p. 436.

35

36 Ibid., p. 474.

37 *The Marsh Arabs* by Wilfred Thesiger, Penguin Books, London, 1967, and originally Longmans Green, London, 1964.

38 Le Renard Pale, p. 370.

39 Sagan and Shklovskii, op. cit., p. 461. (It is not true, as he says on p. 460, the previous page,

that 'the idea of planets circling suns and stars is an idea which essentially originated with Copernicus', as anyone reading Appendix One will see )

40 MacGowan, Roger and Ordway, Frederick, *Intelligence in the Universe*, Prentice Hall Inc., New Jersey, U S A., 1966, pp. 242-4

41 *Interstellar Communication*, ed. by A. G. W. Cameron, op. cit., p. 93. Dr. Huang is currently of the Dearborn Observatory at Northwestern University in the U S A.

Ibid., p. 440

Ibid., p. 441

Ibid., p. 440

Ibid., pp. 309-10

Ibid., pp. 156-60

pp. 156-60

pp. 157-60

p. 287

p. 444

pp. 444-5

pp. 444-5

Ibid.,

Ibid.,

Ibid.,

Ibid.,

Ibid.,

Ibid.

Ibid., p. 439

Ibid., pp. 437-9

Ibid., pp. 436-9

## APPENDIX I

The Moons of the Planets, the Planets around Stars,

and Revolutions and Rotations of Bodies in Space.

Described by the Neoplatonic Philosopher Proclus

' In each of the planetary spheres there are invisible stars which revolve together with their spheres ' So said Proclus the Platonic successor in a.d. 438

The non-specialist reader will never have heard of Proclus, one of the greatest intellects in the history of philosophy, who lived from a.d. 410 to 485. The only easily available English translation of this Greek philosopher's gigantic output is his *Elements of Theology*<sup>1</sup> (which is not relevant to what we are to consider here). But the persistent inquirer may obtain his *Commentary on Euclid*<sup>2</sup> and his *Commentary on the First Alcibiades of Plato*<sup>3</sup> in English: the former from America, the latter from Holland. And from Leidenstein one may now obtain in English the end of the seventh book of his *Commentary on the Parmenides of Plato*.<sup>4</sup>

What the persistent inquirer will likely not be told by any compendium of information on the subject is that most of the works of Proclus were translated into English by Thomas Taylor at the turn of the eighteenth and nineteenth centuries in England and are to be found in a handful of libraries (though even the British Museum has a far from complete collection of Taylor's life's work).

Perhaps it would be as well to quote the view of Proclus held by Thomas Taylor. One should bear in mind that Taylor was the first man to translate all of Plato's works into English: a mammoth task indeed, but not as wearying as translating most of Proclus! Here, then, is what Taylor says of Proclus:

To the lovers of the wisdom of the Greeks, any remains of the writings of Proclus will always be invaluable, as he was a man who, for the variety of his powers, the beauty of his diction, the magnificence of his conceptions, and his luminous development of the abstruse dogmas of the ancients, is unrivalled among the disciples of Plato.

There are many classical scholars who like to imply that the 'Golden Age' of Greece was the only significant era in Greek philosophy. Within this period one can conveniently place Socrates, Plato, Aristotle, Euripides, Sophocles, Aeschylus, Demosthenes, and the historians Herodotus, Thucydides, and Xenophon.

These brilliant names tend to blind one into accepting the false notion that Greece at any other period in its history was merely second rate in the intellects it produced. Many scholars are passionately dedicated to deriding any Greek

appendix 1

229

intellects either before or after this 'Golden Age'. Some caustic comments have been made about this by other scholars, and there is no denying the tendency to ignore or belittle—even to suppress and deny—Greeks who preceded or followed the glorious 'Golden Greeks' who are most familiar to us. It certainly is an embarrassing fact, then, for certain classical scholars to have to face, that the Platonic Academy continued to function in Athens for over nine hundred



years

Regarding the Academy, George Sarton says in *A History of Science - Ancient Science through the Golden Age of Greece* 5

At the time when (the Emperor) Justinian closed its doors, (the Academy) might have celebrated its 916th anniversary — the Academy changed considerably in the course of centuries — it is only the Old Academy that may be considered as Plato's Academy, and it lasted a century and a half or less. To this one might reply that every institution is bound to change with the vicissitudes of time and that the longer it lives the more it must be expected to change. Bearing these remarks in mind, we may put it this way: the Academy of Athens, the Academy founded by Plato, lasted more than nine centuries.

Those who find chronology difficult to comprehend without analogies might wish to ponder this: the duration of the Platonic Academy (apparently on the same site) in Athens was equivalent to the duration to date on English soil of Westminster Abbey, or, the 916 years of life of the Academy as a philosophical institution was equal to the amount of time which will have elapsed from the Norman Conquest of Britain in 1066 to the year 1982. (And even after the dismemberment, the Academy continued 'in exile' in Persia, etc.) We thus see that Plato's Academy existed longer on one spot than Britain has existed since William the Conqueror.

The Platonic tradition in the broader sense, with its gnostic and heretical overtones and its myriad manifestations in later ages in such bizarre and fascinating figures as Giordano Bruno, Marsilio Ficino, John Dee, and even Sir Philip Sidney and the Earl of Leicester — not to mention the troubadours of Provence, Dante in Italy, and the massacred tens of thousands of Albigensians in France, the Knights Templar, and an infinite range of hopeless causes over two and a half millennia, is an agonizing and impossible problem for the orthodox mind, whatever its creed. For Platonism in the general sense is a creed which denies creed, an anti-institutional tradition known to those who adhere to it as the 'Great Tradition'. It resembles the Society of Friends (Quakers) in insisting on nothing by way of doctrinal dogma. It is truly free, it has no membership, no tithes, no rules which are enforced, it has no Pope, no Caliph. It terrifies those weaker mentalities which crave a structured belief system, they always try to destroy it, but succeed only in destroying individuals and individual 'movements' within the larger tradition.

How can any 'intellectual establishment' conceivably admit that this undercurrent of spirituality has flowed outside the orthodox boundaries of the official religion of Christianity since the third century and the time of Origen? And now confess that Proclus, who lived seven hundred years later than Plato, had a mind as luminous in his own way as Plato's? What happens to the the 'hermetically

## THE SIRIUS MYSTERY

sealed Greek miracle' then ? If Platonism is seen to continue as a persecuted underground movement for two thousand years and more, what conclusions must we draw about the supposed openness of orthodox Western culture ? If our commonly accepted pattern of civilization is seen to be based on a lie, based on the denial of the non-orthodox, the implications are so immense that nothing short of a total intellectual upheaval could result. No person with a vested interest, whether a chair at a university or a weekly newspaper, a large corporation or a television station (or a diocesan see) would be completely isolated from the results which would follow. The results need not be destructive in the sense of a political or social revolution, but they would be more fundamental and hence more far-reaching in the end. It is fear of constructive change (which amounts to fear of the unknown) which is here involved. These indeed are problems. And they go some way to explain why the reader hears nothing of a great many subjects which have a direct relevance to the matter. One of the many such subjects is Proclus. No one dares to discuss what Proclus really stood for and what he represents beyond his own specific ideas. Even to raise the subject of a figure such as Proclus is to bring the skeleton from the closet and rattle it with a vengeance.

Proclus does not even rate his own entry in the Penguin Companion to Literature, vol. 4, which deals with classical literature. He is mentioned under an entry for Neoplatonism by D. R. Dudley.

He was a strange combination - possible in that age - of philosopher, logician, mathematician, and mystic. Neo-Platonism gave to the intellectual of the last phase of paganism a metaphysical religion. The figure of the sage gazing upwards in contemplation is often found on late imperial sarcophagi.

Notice the phrase 'possible in that age', implying as it does that no person today would even consider trying to know something about so many subjects in our age of perverse over-specialization. Proclus, we are told, 'was a strange combination'. Dudley tells us nothing of what Proclus wrote, nothing of his ideas, nothing of the immense bulk of his writings, and in his bibliography refers us only to the harmless and difficult *Elements of Theology*. We are left to conclude that Proclus was an extinct species like the dodo, interesting only because he was 'a strange combination possible in that age'. There are very few historians dealing with the fifth century A.D. We assume from what Dudley says that only they could be interested in a 'strange combination possible in that age'. Surely Proclus, of whom we are told nothing of importance, is totally unimportant. Would the Penguin Companion mislead its readers? Such a thing is unthinkable.

Professor A. C. Lloyd of the University of Liverpool, was given the task of discussing Proclus as part of his contribution to the *Cambridge History of Later*

Greek and Early Mediaeval Philosophy, a compendium which did not exist before 1967 and which was reprinted with corrections in 1970. The publication of this large volume of 715 pages marked the attainment of a stage in classical scholarship where many scholars were officially agreeing that they were running out of things to do in the more usual areas and had better begin compiling guidelines for a study of the long-neglected subject of the above-mentioned book. Such lonely figures as Richard Walzer, Philip Merlan, and the late

## APPENDIX I

231

I. P. Sheldon Williams, long engaged in these arcane pursuits out of pure interest, were summoned to help delineate the bounds within which a new generation of students might have some new fields in which to do their Ph.D. theses and where some original work remains to be done by the professors who have now tidied up the Pre-Socratic field rather well and need new ground for some genuine problem-solving.

But to return to Professor Lloyd, who has made an interesting attempt to describe Proclus and some aspects of his thought and writings. It is important for us to know more about Proclus the man.<sup>7</sup> Here is part of Lloyd's account:

Proclus was born at Constantinople in 410 or shortly afterwards. But his parents, who were patricians from Lycia in south-west Asia Minor, sent him to school in their country and then to Alexandria to study literature and rhetoric. Instead of law, which was his father's profession, philosophy attracted him, so he attended lectures on mathematics and Aristotle. The next stage was Athens.

His studies at the Platonic Academy there are then described, and it was this School of which he was to become the Head. It is not known when he took over the School, but he remained at its head till he died in 485. He never married and his only defects were a jealous nature and a short temper.<sup>8</sup>

His short temper seems to have extended to impatience with those who were slow to understand what he was saying or who made irritating difficulties over petty details. For instance, he begins his mammoth work *Commentary on the Timaeus* of Plato with this extraordinarily testy sentence: 'That the design of the Platonic *Timaeus* embraces the whole of physiology and that it pertains to the theory of the universe, discussing this from the beginning to the end, appears to me to be clearly evident to those who are not entirely illiterate.'

It is now that we begin to consider the connection which Proclus has with the larger subject of our book. We will continue with Professor Lloyd's description of Proclus.

Proclus moved in important political circles, but like other leading Platonists

he was a champion of pagan worship against imperial policy and found himself more than once in trouble. There is no doubt of his personal faith in religious practices. A vegetarian diet, prayers to the sun, the rites of a Chaldaean initiate, even the observance of Egyptian holy days were scrupulously practised. He is said to have got his practical knowledge of theurgy from a daughter of Plutarch [the Platonist, not the author of the *Lives*], and according to his own claim he could conjure up luminous phantoms of Hecate. Nor is there any doubt that he put theurgy, as liberation of the soul above philosophy. But while his philosophy is full of abstract processions and reversions, philosophy was nothing for him if not itself a reversion, a return to the One, though achieving only an incomplete union. Its place can be seen in an almost fantastically elaborated metaphysical system, but although this system would not have been created had there not been a religion to justify, its validity does not depend and was not thought by Proclus to depend on the religion.

## THE SIRIUS MYSTERY

232

The connection with the mysteries of Hecate as well as Proclus's practising Egyptian and Chaldaean mysteries immediately arouses in the alert reader the suspicion that Proclus might just possibly have known something of the Sirius mystery. Could this be the case? In a moment we will consider some amazing opinions of Proclus on the heavenly bodies which no historian of science I have encountered has ever taken into account (probably because no one ever actually reads through that gigantic tome known as the *Commentary on the Timaeus* of Plato which I mentioned a moment ago). But first let us examine any further evidence than this slim fact which might link Proclus with the general milieu of our Sirius tradition. Professor Lloyd provides further interesting remarks:

Proclus believed that his metaphysics was the true though hidden meaning of Plato and that this like all Greek theology derived from the secret doctrines of Pythagoreans and Orphics. It can be studied in two works, the *Elements of Theology* and the *Theology of Plato*, with help here and there from the commentaries on the *Parmenides*, *Timaeus*, and *Acibiades*.

It must be emphasized that in the form of such commentaries, the Neoplatonists produced much purely original and creative philosophy. It is fashionable at the moment to ridicule their commentary format as derivative and inferior. This is a pathetic attempt to deride what cannot or will not be appreciated. An example may be seen in the description by Professor Robert Browning of Birkbeck College, University of London, in the Penguin Companion volume, of the commentaries of Proclus's later successor Simplicius as 'misconceived and pedestrian textbooks'. The word 'misconceived' is loaded, and immediately lets us know that Professor Browning disagrees with them in principle and therefore derides them. However, in my own reading of Simplicius's

Commentary on Epictetus, for instance, I was amazed to find a luminous intellect behind the commentary, whose dissertations on free will are so startlingly contemporary that I immediately thought of comparing them with writings of our modern cybernetic age, such as the fascinating books by Norbert Wiener. In Chapter One Simplicius speaks of 'those who pretend that our opinions and desires, and generally speaking, all of our choices and intentions, are necessary and not at our own disposal, but come from exterior causes outside ourselves, not coming from us of our own volition.' He attacks the 'Behaviourists' of his day in clear and forceful terms which are not restricted in relevance to his own times by any means. Some of his reasoning is so acute and many of his insights are so profound, that I can see no reason why not a single word of his writings can be obtained in English from any publisher in the world.

Of the works of Proclus, it is really the Commentary on the Timaeus of Plato (which I shall abbreviate from here on as *In Tim.*) which is the source of Proclus's views on the cosmos and of his views of the Platonic succession of an esoteric tradition from the ancient mystery religions. Professor Lloyd, in a footnote to his passage last quoted, does not give this reference on these points, but instead refers to other works by Proclus. In his entire treatment of Proclus, Lloyd gives only slight and cursory reference to the *In Tim.* However, it is to the *In Tim.* which we must now turn. Since page references to the Greek text of Lipsiae would be useless to most readers, I give page references to Taylor's English translation, vols. I and II.

## APPENDIX I

233

At the end of Book IV of *In Tim.*, Proclus says (II, 307): 'But it is Pythagoric to follow the Orphic genealogies. For the science concerning the Gods proceeded from the Orphic tradition through Pythagoras, to the Greeks, as Pythagoras himself says in the Sacred Discourse.'

The fact that he entertained this view in relation to the mystery religions is shown in his remarks about Pythagoric principles in *In Tim.*, Book V (II, 312): 'But these are the Orphic traditions. For what Orpheus delivered mystically through arcane narrations, this Pythagoras learned, being initiated by Aglaophemus in the mystic wisdom which Orpheus derived from his mother Calliope.'

He attaches this view to his discussion in *In Tim.* of celestial phenomena. Not long after the above passage he says: 'For Orpheus calls the moon celestial earth.' And in Book III he says: 'The Pythagoreans say (that) the moon is ethereal earth.'

Taking these views, as he does, and claiming to be a devotee of Hecate specifically (a 'Hymn to Hecate' by Proclus survives in which he calls her 'Guardian of the Gates' - an ancient Egyptian title of Horus - and Mother of the Gods - an ancient title of Isis, see IV, 4, 6, of Grant's *Hellenistic Religions*).<sup>8</sup> Proclus seems to stand in the position as an initiate capable of knowing

something of the Sirius mystery. I have found no references, and it would have been considered impious by him to make any direct references to such an esoteric doctrine. But I have found that many theories of his clearly seem to reflect on it and be based on its premise of an invisible star. These theories are so extraordinary that I feel an account of them should be made. And the primary importance of them to us is that in them Proclus speaks with full authority in insisting that certain invisible heavenly bodies definitely exist. These bodies are the moons of the planets and the planets of other stars. Furthermore, Proclus seems to have an incredibly enlightened view of celestial phenomena in many other ways as well.

In Book III of *In Tim.* Proclus says (I 425) that the Moon is made of

celestial earth. Or why else does the moon, being illuminated, produce a shadow, and why does not the solar light pervade through the whole of it?

we shall find that fire and earth subsist also analogously in the heavens, fire indeed, defining the essence of them, but each of the other elements being consubstantial with it.

Shortly afterwards he says

The elements being conceived in one way as unmixed, but in another as mingled, the first mixture of them produces the heavens, which contain all

things according to a fiery characteristic. For all things are in the heaven

according to a fiery mode.

We know from other citations above that the theory of the moon being celestial earth' is a 'Pythagoric-Orphic' one which Proclus has adopted. The fact that he here extends the observation to the remarks of the general nature of the celestial bodies implies that those ideas come from the same source. The heavens are indeed of a fiery mode, for we now know scientifically that stars

---

234

## THE SIRIUS MYSTERY

possess all the normal chemical elements in a fiery mode. Proclus's description of celestial bodies could be perfectly in harmony with our present-day scientific knowledge. It is true, as Proclus says, that the stars may be described with 'fire indeed, describing the essence of them, but each of the other elements being consubstantial with it'. For, though they are ablaze, stars are known to contain all elements.

Proclus makes absolutely clear that when he speaks of 'fire' in the heavens

he is shaking figuratively. He says (page 280) 'Hence, the fire which is there (in the heavenly bodies) is light and it is not proper to disturb the discussion of it, by directing our attention to the gross and dark fire of the sublunary region [the below the moon, or earthly region]. And to make it beyond the slightest possibility of misunderstanding, he adds (page 281) that fire in the heavens is 'fire which is not perfectly fire but, rather, star-fire is more properly 'fire which is in energy'

These conceptions are quite astounding in the light of modern science. In fact, modern theories of there being in space an interstellar medium which is of such a tenuous nature that it is barely perceivable to us but nevertheless quite extensive (not the old-fashioned 'Aether'), find an uncanny forerunner in Proclus's strange statement from Book III of *In Tim.* (I, 425)

It is also necessary that the middle elements should be in the heavenly bodies, but that different elements should abound in different parts of the celestial regions. And in some places indeed, it is necessary that the fiery nature should widely scatter its splendour, on account of solidity, as in the starry bodies, but in others, that it should be concealed from us, as in the spheres that carry the stars.

No matter what interpretation one may put on these remarks by Proclus, the fact remains that he views the stars as congealed bodies in a celestial medium and that between them lies fiery matter which is invisible to us. As for his references to the spheres, these are hardly the glassy globules familiar to us from more conventional ancient astronomy as we shall see.

In Book IV of the *In Tim.* (II, 293), Proclus ridicules epicycles and says they are valuable as 'an excellent contrivance' by which to analyse and comprehend the true simple motions of the stars,

just as if someone, not being able to measure a spiral motion about a cylinder, but afterwards assuming a right line moved about it, and a point in the right line measuring its motions, should find what the quantity is of the motion about the spiral in a given time. To this therefore the attention of those is directed, who employ evolvents, epicycles, and eccentrics, through simple motions, from which they discover a various motion.

We thus see that Proclus, despite his late date, is no prisoner of the Ptolemaic theory of the universe. Ptolemy lived three hundred years before him, but Proclus was a hold-out against his epicycles, preferring the views expressed above. In fact, Proclus views the spheres in a way which is extremely surprising, for in Book IV of *In Tim.* (p. 273) he says, 'Thus also the planets are moved with an advancing motion, but not the spheres of the planets'

This is quite a clear statement that the planets move while their 'spheres

or dare we say it? orbits are really the spaces in which this movement takes place. However, we need not be too cautious here. Benjamin Jowett uses the word 'orbit' in his translation of the text of Plato (38-39) on which Proclus is here commenting. There is no reason why we should refrain from doing the same.

We are thus confronted with a clear description by Proclus (less obscure than Plato's own vague account) of the planets moving in orbits which themselves are clearly conceived as trajectory spaces. And this concept is so scientifically accurate and advanced, and so contrary to the then fashionable view that the 'spheres' of the planets moved and carried the planets along with them, that we must appreciate the precocity of Proclus in putting the notion forward so clearly and persistently. Plato's text may be interpreted in the same way, but it is not customary to do so, and it is too vague by far. A typical example of the standard interpretation of the passage in Plato's own *Timaeus* is that given by Professor A. C. Crombie in vol. I of *Augustine to Galileo* (though he does on page 33 describe the *Timaeus* quite starkly as a 'Pythagorean allegory', which is presumably a daring way to put it) on page 49:

The different spheres in which the seven planets', Moon, Sun, Venus, Mercury, Mars, Jupiter and Saturn, were set, revolved with different uniform velocities such as would represent the observed movements of those bodies.

This is purely an interpretation of a vague text. One could just as well say that Plato maintained that the spheres did not move and the planets in them were what moved, as Proclus specifically states (and as he seems to think Plato believed).

Proclus goes out of his way to say (p. 279)

(Plato) is evidently of opinion, that the planets become through themselves, more remote from, and nearer to the earth, and that their revolutions according to breadth, are made by their own progressions, and not through being carried by other things, such as evolvents or epicycles.

This puts Proclus in a position diametrically opposite Professor Crombie in interpreting the text of Plato. I am afraid that I, for one, must come down on the side of Proclus in such a contest. In any case, Professor Crombie has shown himself quick to alter a view if presented with fresh evidence on the matter, as he has demonstrated on an entirely different subject in correspondence with the author.

Near the very end of Book IV of *In Tim.* (pp. 293 ff.) Proclus says

With respect to the stars, however, those that are fixed, revolve about their own centres. But the planets revolve in conjunction with the inerratic sphere, and each is moved together with its sphere to the east, and revolves



by itself according to breadth and depth, and about its proper centre

It is worth while for us to examine these remarks of his closely. First of all, the 'in-erratic sphere' of the fixed stars revolves around the Earth and the planets do the same in conjunction with it. That is the simplest of the motions. But on top of that are several more motions: first, the fixed stars rotate on their

axes in a spin rotation, second, the planets do the same: third, the planets do more than that: each planet 'by itself (i.e. in separate motion from all the other stars and planets as well as separate from the 'spheres') 'revolves according to breadth and depth', which obviously refers to 'becoming by itself more remote from and nearer to the earth, as seen from the previous quote. And this depth of planetary motion, which Proclus here specifically calls 'according to breadth and depth' literally adds a new dimension to any theory of planetary motion. For whereas anyone who observes the sky over long periods can see that the planets appear to get dimmer and brighter as if they were becoming more remote from and nearer to the earth, the formal description of planets operating in terms of a dimension at right angles to their apparent revolutions comes very close indeed to pointing to a central point of their revolutions which is something other than the Earth. There was a tradition that Plato came to believe this, which was publicly proposed by Aristarchus of Samos and partially advocated by Plato's friend Heraclides of Pontus. We know that Proclus was aware of it: 'Let Heraclides Ponticus therefore, who was an auditor of Plato, be of this opinion: for he ascribed a circular motion to the Earth (In Tim. II, 288). In short: that the Earth revolves around some other centre such as the sun. But let it be admitted that Plato established it immovable' (ibid.). Thus does Proclus admit the controversy and come down on the side of caution concerning revolution about the sun.

It is phenomenal that Proclus, with an insight which is difficult for us to comprehend, attributed to all celestial bodies a spin rotation about their axes. And since the Earth is a celestial body, it is to be wondered whether Proclus gathered the appropriate conclusion: that the Earth rotates and that is what makes the sky seem to revolve about us.

In considering this point we must realize that in the *Timaeus*, Plato mentions the rotations of the heavenly bodies on their axes (40a-b): 'And (the Creator) gave to each of (the stars) two movements: the first, a movement on the same spot after the same manner: the second, a forward movement.

This is an obscure way of saying the stars rotate and the sky circles. (If Plato inserted someone else's treatise into his dialogue without being fully au fait with the material—as has been maintained—it may explain the vagueness, though Plato does no better in the *Laws* and was a feeble astronomer.) In the

same passage as above, Plato also clearly describes the following. "The earth, which is our nurse, circling around the pole which is extended through the universe, which refers to the rotation of the earth itself on its axis

Proclus apparently adds of his own volition the other motions for Plato seems only to mention two. Furthermore, Plato's text is too brief and foggy to make it clear exactly what he did mean. The one thing of which we can be certain is that Proclus expended untold tens of thousands of words expounding Plato's meanings in all fields beyond the extent to which Plato himself managed or desired to do. On some subjects this is not particularly gripping. But with this particular subject, every scrap of evidence is essential to unraveling the intended significance of Plato's statements.

In an essay of his entitled Platonic Questions (not yet published in the Loeb Library series as the last remaining of fourteen volumes, again we see Platonic studies enjoying the lowest priority but published in English in

## APPENDIX I

237

.874)9, Plutarch provides us with essential evidence that Plato definitely abandoned his earlier geocentric ideas, despite Proclus's nervous demurra. Plutarch says in Question VIII

What means Timaeus [see Plato's Timaeus, 42D] when he says that souls are dispersed into the earth, the moon, and into other instruments of time? Does the earth move like the sun, moon, and five planets, which for their motions he calls organs or instruments of time? Or is the earth fixed to the axis of the universe, yet not so built as to remain immovable but to turn and wheel about, as Aristarchus and Seleucus have shown since Aristarchus only supposing it, Seleucus positively asserting it? Theophrastus writes now that Plato, when he grew old repented him that he had placed the earth in the middle of the universe, which was not its place

(Plutarch then follows with his own opinion, which is that the earth does not move.)

Theophrastus's testimony here is unimpeachable, but was probably unknown to Proclus, by whose lifetime most of Theophrastus's works would have been lost. Theophrastus was Aristotle's successor and head of the Lyceum at Athens, and an unquestionably reliable source; and Plutarch leaves us in no doubt (see Against Colotes the Epicurean, 14, in Moralia) that he read Theophrastus's actual works attentively making a misquotation or secondhand report impossible in this instance.

The Seleucus who is mentioned here was a mathematician and astronomer described by George Sarton<sup>10</sup> as follows. "This Babylonian was a follower of

Aristarchus of Samos Seleucus is described differently by Giorgio de Santillana, who gives him another nationality in *The Origins of Scientific Thought*, page 250 'We know of only one [astronomer] who adopted the system [of Aristarchus] a century later Seleucus of Seleucia, an Oriental Greek from the Persian Gulf '

However Plato's views on the earth's position in space are less interesting to us in themselves than as they relate to Proclus's interpretation of them, and also as they relate to modern historians of science, who tend to gloss over the possibility that Plato may have adopted a heliocentric theory of a rotating earth moving round the sun, which was obscurely expressed in the *Timaeus* and less tentatively adhered to by Plato 'when he grew old', bearing in mind that the *Timaeus* itself is no early work of Plato's

In Plutarch's same essay, 29, we find evidence of a continuity from Plato through his student Xenocrates of the belief that the heavens contain more than one element. However, Proclus seems to transcend by far the limited theory of Plato and Xenocrates as here presented. The summary of theories of Xenocrates presumably is drawn from his lost work in six books *On Astronomy* unless from his one lost book *On Things Pythagorean*. Xenocrates was head of the Academy for twenty-five years until his death at the age of eighty-two 'from the effects of a fall over some utensil in the night', as Diogenes Laertius tells us 11

There is clear proof that Proclus did not himself originate the third motion at right angles to revolution which we have seen that Plato does not mention. We actually find it referred to by Plutarch in his dialogue 'Of the Face Appearing in the Orb of the Moon' 24." There he says

238

## THE SIRIUS MYSTERY

Nor is the moon indeed moved by one motion only, but is, as they were wont to call her, Trivia, or Three-Wayed performing her course together according to length, breadth, and depth in the Zodiac, the first of which motions mathematicians call a direct revolution, the second rotation, or an oblique winding and wheeling in and out and the third (I know not why) an inequality, although they see that she has no motion uniform, settled, and certain, in all her circuits and reversions.

Plutarch's expressions 'mathematicians call' and 'as they were wont to call her' make clear that he is referring to some unidentified and now lost astronomical works. Plutarch's exposition is not as clear as we could wish, and in a succeeding passage is countered by another speaker who espouses the more fashionable theory of spheres which actually themselves move while as for the moon 'some supposing that she herself stirs not'. It is peripherally interesting that in this retort the speaker also cites Aristarchus of Samos as being involved in a controversy over a line from Homer's *Iliad* which Plutarch gives and which is missing from our present text of Homer a line advocated by Crates and

opposed by Aristarchus, which correctly describes the sea as covering the most part of the earth

We must not stray too far from Proclus. In pursuit of him, however, I wish to mention his influence on Johannes Kepler, the sixteenth-century discoverer of the three laws of planetary motion (which are the only ones we possess even now). And in this I have another complaint to make. For not one major work of Kepler's has ever been translated into English.<sup>13</sup> This fact is enough to send one into despair. Who wants to plough through a lot of medieval Latin to read Kepler, and who can? But what has Kepler to do with Proclus? Well, Kepler was steeped, indeed, drenched, in Proclus. The interested reader may turn to the closing pages of *Harmones of the World* in the *Encyclopaedia Britannica* vol. 16, Ptolemy, Copernicus, and Kepler<sup>14</sup>, and read for himself. He will find there remarks about Proclus, after which Kepler says: "But also I have recently fallen upon the hymn of Proclus the Platonic philosopher, of whom there has been much mention in the preceding books, which was composed to the Sun and filled full with venerable mysteries in the context of speculation about what did the ancient Pythagoreans in Aristotle mean who used to call the centre of the world (which they referred to as the "fire" but understood by that the sun) "the watchtower of Jupiter"?"

Here we see that Kepler, the great forerunner of Newton, was delighted with the 'venerable mysteries' of Proclus. In the light of what we know now and will shortly discover further, later in this appendix, about Proclus's theories, what effect did they have on Kepler's own thinking?

Was Proclus standing behind Kepler just as Aristarchus stood behind Copernicus? When will Kepler and Proclus be fully available in English so that any intelligent person can make up his own mind without first becoming fluent in often highly technical medieval Latin? But most important of all, were the greatest advances at the commencement of modern cosmological speculation made by virtue of their generation from suppressed and unorthodox ancient sources such as Proclus and Aristarchus? Did the 'secret side' of ancient astronomy from the Pythagoreans to Proclus really engender the origins of our

appendix 1

239

modern cosmologies? And the corollary of this is: If so, are the possibilities of our making certain breakthroughs being stymied by the very suppression of the sources which may have engendered the earliest breakthroughs? By cutting off the root of Kepler, can we really expect the branch to continue to flower? If the facts about Proclus's theories which are being presented in this appendix really have gone unremarked by all the leading historians of science upon whom we all usually rely to tell us at second hand all the facts which we feel we have no time to discover at first hand, then something is clearly wrong with the system. We have got to overhaul the mechanics. Otherwise we shall continue to spiral downwards and think we are rising. I am referring to means

and sources of inspiration. I do not question for a moment that vast progress is made in many areas. But I do maintain most strongly that our system for deriving inspiration in theorizing about the cosmos is demented because it is incomplete, therefore unbalanced. We should by now have formulated more laws or principles of planetary motion. But it is fashionable for those who read second-hand cribs of Kepler to deride him. He was a 'nut'. We do not attempt to study his means and methods of thinking or even acknowledge the existence of many of his most important sources. And one of those sources was Proclus. The writings of Proclus are so voluminous that I have to confess that I have not gleaned from them by any means an exhaustive survey of his views. This Appendix is merely a sampling. But of course we have not yet come to the most surprising views of all which we must now consider.

(The planets') adumbrations are situations according to which they darken us and other things. For the body which is arranged after another body, becomes situated in the front of that which is posterior to it. And they run under each other.

Also there are 'their occultations under the sun, and their evolutions into light.' Significantly he here turns to the subject

For it is necessary to recur from the phenomena to the reminiscences of invisible natures. For as from these instruments and shadows, we are enabled to commence the contemplation of the celestial bodies, thus also from the latter, we recall to our recollection invisible circulations.

It is not an easy thing to know what Proclus is referring to. His sudden dropping of this large but obscure hint cannot be meant to be understood by everyone—not even those 'who are not entirely illiterate' as he testily warned us in the very first sentence of his huge tome. This particular work by Proclus is extremely difficult to read, and the Thomas Taylor translation has neither any index nor any form of table of contents by which to locate subjects, names or references in the text. The Lipsiae Greek text has an index—but there is no means of correlating it with the Taylor translation, which has no textual numbering.

Can this reference to 'invisible circulations' refer to the invisible circulations of the companion of Sirius? The answer to this question cannot be a final 'no' and the possibility must be seriously considered when we read these next opinions of Proclus from *In Tim.* Book IV (II. 28.)

## THE SIRIUS MYSTERY

As Aristotle, however, inquires why the sphere of the fixed stars, being

one, comprehends many stars, but in each of the planetary spheres, which are many, there is only one star, the solution of this conformably to his own opinion may be obtained from his writings. But we have already said something concerning this, and now agreeably to what has been before asserted, we say, that each of the planets is a whole world, comprehending in itself many divine genera invisible to us. Of all these however the visible star has the government. In each of the (planetary spheres) there are invisible stars, which revolve together with their spheres, so that in each, there is both the wholeness, and a leader which is allotted an exempt transcendence. Each of the spheres is a world, theologians also teaching us these things when they say that there are Gods in each prior to daemons, some of which are under the government of other. From all which it is evident that each of the planets is truly said to be the leader of many Gods, who give completion to its peculiar circulation.

Taylor, in a footnote, rightly calls this an extraordinary passage of the

treatise! Italics above are mine

Elsewhere Proclus says (In Tim., II, 260): 'There are, however, other divine

animals following the circulations of the planets, the leaders of which are the

seven planets.' Taylor adds to this in a footnote: 'And these, as we have before

observed, are what the moderns call satellites.'

In another of his publications, Thomas Taylor writes, as introduction to his

translation of Plato's Timæus itself 15

(For) each of these spheres. . . as we have already explained, it follows that every planet has a number of satellites surrounding it, analogous to the choir of fixed stars. And that every sphere is full of gods, angels, and daemons, subsisting according to the properties of the spheres in which they reside. This theory indeed is the grand key to the theology of the ancients, as it shews us at one view why the same god is so often celebrated with the names of other gods, which led Macrobius formerly to think that all the gods were nothing more than the different powers of the sun, and has induced the superficial, indigroping moderns to frame hypotheses concerning the ancient theology so ridiculous that they deserve to be considered in no other light than the ravings of a madman, or the undisciplined conceptions of a child. But that the reader may be convinced of this, let him attend to the following extraordinary passages from the divine commentaries of Proclus on the Timæus. And in the first place, that every planet is attended with a great number of satellites, is evident from the following citation. 'There are other divine animals attending upon the circulations of the planets, the leaders of which are the seven planets and these revolve and return in their circulations in conjunction with their

leaders, just as the fixed stars are governed by the circulation of the inerratic sphere [p 279] And in the same place he informs us, that the revolution of these satellites is similar to that of the planets which they attend, and this, he acquaints us a little before, is according to Plato a spiral revolution (and) 'about every planet there is a number (of satellites) all of them subsisting with proper circulations of their own' [p 275]

appendix 1

241

The reader should note that Thomas Taylor describes this knowledge as 'the grand key to the theology of the ancients' We know from a fragment of Damascius,<sup>6</sup> the Neoplatonist that the Egyptian philosophers, who are resident among us, have explained their occult truth, having obtained it from certain Egyptian discourses. According to them, then, it appears to be this. The One principle of the Universe is celebrated as Unknown Darkness, and this three times pronounced as such 'But wherever the information came from, the fact is that Proclus and his Neoplatonic colleagues believed the ultimate secrets of religion concerned two things: the invisible Dark and invisible circulations of certain heavenly bodies, some of which were non-esoteric enough even to be specified, namely the satellites of our planetary system. Proclus winds up a dissertation on the source of this knowledge from 'sacred rumour' which concerns 'invisible circulations' also on page 247 of *In Tim., II*

Since Proclus specifically describes here and in the passage from *In Tim.* II, 281, the orbits of the heavenly bodies as their 'circulations' (Taylor's choice of English) the invisible circulations which he mentioned must be invisible orbits of heavenly bodies, and he also tells us that there are invisible heavenly bodies. So what invisible orbitings of invisible heavenly bodies are so important that they can, as Proclus just told us, 'enable us to commence the contemplation of celestial bodies' and vice versa? Is that not a most curious thought? How can he possibly mean that there are invisible orbitings so important that they may be set against the visible orbitings for importance, the one complementing the other even to the very base of our abilities to contemplate the heavens?

The key to the paragraph from Proclus II, 281 is the expression in it: 'theologists teaching us these things' For in those words Proclus firmly identifies these ideas with a theological as opposed to philosophical tradition, and hence one connected with one or more of his mystery religions. This is just the evidence we need. For it is these mystery religions which we know contained the essence of the Sirius mystery as their secret doctrine. And also, as we have seen earlier Proclus sought to interpret Plato in terms of an esoteric tradition with which Proclus himself was connected directly, as an initiate.

So we see that Proclus believed that invisible 'stars' existed which accompanied the planets, and that each of the planets was a world. And the visible star, that is the planet, has the government' over the invisible satellites in each case. How very like the Sirius tradition this is! And as we know from Chapter One of this book, the Dogon also knew of the moons of at least one of

the planets, so that knowledge of them seems likely to have been part and parcel of the Sirius mystery. Can we then conclude that Proclus may be one further person with knowledge of the Sirius mystery?

Proclus is more specific about his planetary moons elsewhere. In his work the Platonic Theology, Chapter XIV of Book VII (Vol. II, pages 140-1 of Taylor's translation), we read

But the planets are called the Governors of the world (cosmocrators), and are allotted a total power. As the inerratic sphere too has a number of starry animals, so each of the planets is the leader of a multitude of animals, or of certain other things of this kind. In each of the planetary spheres,

242

## THE SIRIUS MYSTERY

therefore, there is a number of satellites analogous to the choir of the fixed stars, subsisting with proper circulations of their own. The revolution also of these satellites is similar to that of the planets which they follow; and this according to Plato is a spiral revolution. With respect, likewise, to these satellites, the first in order about every planet are Gods, after these daemons revolve in lucid orbicular bodies, and these are followed by partial souls such as ours.

Taylor comments in a footnote in In Tim. Book IV (II, 299): 'For "the natures successive" to the stars, are evidently their satellites, which have more than once been mentioned by Proclus.' On the same page a second footnote adds: 'From what is here said by Proclus, it appears that the fixed stars, as well as the planets, have satellites, and that the stars which sometimes are visible, and at other times disappear, are of this description.'

This brings us extremely close to an outright statement of the principles of the Sirius mystery, but without any names. These footnotes are to the passage immediately following the one given a moment ago where we first considered Proclus's cryptic reference to the 'invisible circularities'. It is interesting to note that the passage is in the form of a commentary on a specific passage in Plato's Timaeus (40-c), which is not only one of the most maddeningly obscure passages in all of Plato ('Do not expect me to explain these mysteries', bewails a baffled George Sarton, p. 451, op. cit.) but a passage which Proclus quotes including missing words not otherwise known from the official text of today.

And it is even more curious that the 'missing' words quoted by Proclus are *kai ta toutois ephexes* of which Taylor says: 'These words, however, are not to be found in the text of Plato, but form a remarkable addition to it. Taylor should know, as he had previously translated all of Plato's dialogues including this

Since Proclus was head of the Academy, he may be assumed to have had a



reliable copy of Plato's text in the Academy library. If he did not have a reliable copy of Plato's text in Plato's own Academy, what did he have a reliable text of? Hence these words must be entertained as a possibly correct version and should probably be added to the currently accepted text by classical scholars. The meaning of the words is translated by Taylor as 'the natures successive' that is successive to the stars. And Taylor's comment is: 'For the natures successive to the stars, are evidently their satellites, which have more than once been mentioned by Proclus'

The fact that a reference to the satellites of stars was dropped from the orthodox text of Plato should come as no real surprise to us. What scribe could fathom the meaning? In copying the manuscripts over the centuries, then creep in corruptions. A reference to satellites of stars would have been too shocking, considered too bizarre. In transmission the words must have been dropped as an incomprehensible aberration or an insertion. It was only in the Academy's own library that the original words were preserved, safe and musty in the wrappings of some really old bookrolls with which no one tampered textually. Only in the Academy would ravages against the text of the Mantel

be forbidden

I do not believe it is a coincidence that our search through Proclus for material relevant to the Sirius mystery has led us to a lost fragment of text of

appendix 1

243

Plato's dialogue Timaeus. The fact that these words have been dropped from that dialogue out of the entire body of Plato's work, which is otherwise so well documented from the myriad commentaries and citations over the centuries illustrates the controversial nature of our subject as strikingly as any of the 'accidents' we have already encountered in our book. Our Sirius mystery is not letting us down. Every subject we have approached in connection with it has been suddenly transformed as in a magic mirror in a fun house. Nothing that seemed staid and settled has been able to remain in its mould. Even Plato's solid text begins to quiver like a jive jelly. From out of so many ossified subjects have crept mysterious little creatures, which have done disrespectful dances on their premises, indicating that these subjects do not want to lie down and be declared dead. They are living. Inside them glow sylphs and secrets. We cannot force them to turn to stone.

It seems clear that the abandoned four words of text were probably dropped in order to avoid the enormous consequences which must follow upon their being retained: that Plato himself, though not particularly well acquainted with astronomy in an active professional sense, had apparently some links to a tradition which, by being esoteric, seemed to make no sense at all outside a secret mystery context. This is true whether Plato wrote the passages himself

or inserted the Pythagorean treatise which has been proposed (see later).

Plato's dialogue Timaeus is without doubt the most difficult and bizarre of the unquestioned Platonic writings (the Epinomis is more bizarre, but seems to have been written by Plato's disciple Philip of Opus). Let us examine a few remarks concerning this strange work, taken from George Sarton (op cit): 'There is more Oriental lore in the Timaeus than Greek wisdom' (p. 423, note). 'The astrologic nonsense that has done so much harm in the Western world and is still poisoning weak-minded people today was derived from the Timaeus, and Plato's astrology was itself an offshoot of the Babylonian one. In justice to Plato it must be added that his own astrology remained serene and spiritual and did not degenerate into petty fortune telling' (p. 421). 'The influence of the Timaeus upon later times was enormous and essentially evil' (p. 423). 'Many scholars were deceived into accepting the fantasies of that book as gospel truths. That delusion hindered the progress of science and the Timaeus has remained to this day a source of obscurity and superstition' (p. 430).

Those are strong words. The Timaeus (the more commonly used spelling in English) obviously arouses violent reactions in some. Here we see Sarton, one of the most distinguished and respected historians of science who ever lived, raving hysterically that the 'evil' Timaeus is responsible for 'hindering the progress of science'. Sarton's views of Plato in general are incredibly violent and hostile, though many of his criticisms of Plato are quite valid and reasonable. If it were not for the purple prose. It is certainly true that there were many faults to Plato's theories, particularly his political ones which Aristotle rightly found so repulsive, and these rouse Sarton to a fury surpassing his slurs on the poor Timaeus. But this is common among expert scholars. They have to restrain themselves most of the time for purposes of professional poise and objective treatment. But the mask can fracture and a raw nerve protrude.

But as for the perplexity or ire which the Timaeus seems alternatively to arouse in so many of those who attempt to study it, we should realize that the

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244

## THE SIRIUS MYSTERY

W

tradition is probably true which says that the major portion of the dialogue, which consists of a lengthy speech by the character named Timaeus on the nature of the universe, is really not written by Plato, but was inserted by him as the words of an apparently imaginary character (or a disguised one). For many ancient sources maintained that this part of the dialogue was in reality a Pythagorean treatise which Plato obtained during one of his visits to Sicily. Rather than see the treatise disappear into obscurity, Plato is said to have

entered it as the contribution of a character in a dialogue using the discussion of the other characters as a means of setting it off to proper advantage. And it is this supposed Pythagorean treatise which contains all the material of interest to us in connection with the Sirius mystery. And as for the Pythagoreans, they represented a sacred community and a mystery tradition with roots in Egypt and Babylon (of both of which countries Pythagoras himself was said to be an initiate into the mysteries)

I owe it to the reader to display the evidence that the passage in the Timaeus which is of such concern to us, and on which Proclus's commentary is based as it concerns the heavenly bodies, was not even written by Plato. I therefore quote from Book VIII 85 of the Lives of Eminent Philosophers by Diogenes Laertius (the Loeb Library translation)

Philolaus of Croton was a Pythagorean, and it was from him that Plato requests Dion to buy the Pythagorean treatises. His doctrine is that all things are brought about by necessity and in harmonious inter-relation. He was the first to declare that the earth moves in a circle (round the central fire), though some say it was Hicetas of Syracuse.

He wrote one book, and it was this work which, according to Hermippus, some writer said that Plato the philosopher, when he went to Sicily to Dionysius's court, bought from Philolaus's relatives for the sum of forty Alexandrine minas of silver [an 'equivalent value' for this was before Alexander], from which also the Timaeus was transcribed. Others say that Plato received it as a present for having procured from Dionysius the release of a young disciple of Philolaus who had been cast into prison.

According to Demetrius in his work on Men of the Same Name, Philolaus was the first to publish the Pythagorean treatises, to which he gave the title On Nature, beginning as follows: 'Nature in the ordered universe was composed of unlimited elements, and so was the whole universe and all that is therein.'

In line with this tradition that the treatise embodied into the Platonic Timaeus was of Pythagorean origin and presumably from thence derived itself from Egypt and Chaldaea (Babylonia) we may read the following interesting remarks of Proclus from In Tim. Book IV (II, 273):

The Egyptians prior to (Hipparchos and Ptolemy), employing observations, and still prior to the Egyptians, the Chaldaeans (Babylonians), being taught by the gods, prior to observations, were of a similar opinion to Plato, concerning the motion of the fixed stars. For the Oracles not only but frequently speak of the advancing procession of the fixed stars.

Note the pointed expression 'taught by the gods, prior to observations'. This highlights the aspect of the tradition as one imparted to men 'by the gods'.

## APPENDIX I

and then later carried on in concert with observations by the ancient Egyptians. Without my going into a minute discussion of Pythagoreanism, Orphism, and what Proclus calls 'the Oracles', I hope the reader will have gathered sufficient idea of the gist of the matter.

We see that Proclus, using a slender but nevertheless substantial basis of Plato's apparently ancient Pythagorean book *On Nature*, as it is preserved in his *Timaeus*, insisted that the planets had moons, that stars also had satellites, that there were invisible bodies in space with invisible orbits which were somehow of immense importance to us, that 'the gods' instructed the ancient peoples of the Middle East in these astronomical facts which were preserved as Pythagorean and Orphic traditions in the Greek world, that epicycles and other fashionable devices to explain astronomical motions were total nonsense, that the spheres did not revolve but only the planets in them, and hinted at the rotation of the Earth on its axis.

Proclus was, furthermore, a known initiate of the mystery cults of the Egyptians and Babylonians and had a particular connection with rites involving Hecate, the goddess whom we know to be a form of the star Sirius. We may therefore conclude that Proclus is of possible interest to us in our relentless pursuit of the Sirius mystery. For he may have known its secrets and made use of the principles of that secret tradition through the indirect means of his more general writings — by hinting broadly at 'invisible orbits' without specifying any of them, and insisting on their importance without giving any really satisfactory reasons. He seems to have been trying to get the principles across without breaking sacred vows against the revealing of the specifics of the case. As he was extremely religious, we know from his character that he would honour such vows. But as he was passionately devoted to making known the general principles of the universe, he would have done exactly what it seems he did do — tell us the story without giving the names of the characters.

A closer study of Proclus in the future would certainly be rewarding. There are certainly other relevant passages in his works which remain to be dealt with. But we have seen that we must now re-examine Plato as well, for his *Timaeus* has been shown by Proclus to be a more mysterious work than even the most exasperated scholars had ever suspected.<sup>17</sup> And the net of the Sirius mystery is meanwhile seen to spread ever wider through the ancient traditions and literature of all eras.

Two contemporaries of Proclus, named Macrobius and Martianus Capella, also wrote advanced astronomical theories, and both were also in the Neoplatonic tradition. They advocated the notion that the Earth went around the sun. When three people in one tradition at one time write and discuss such advanced material, then a milieu may be said to exist.<sup>18</sup> But, of course, the historians of science have not yet got around to noticing this inconvenient little thing. Nor have they bothered to let us know much about Johannes Scotus

Erigena (otherwise known as John the Scot or Erigena, which is a misspelling) of the ninth century a.d. who promulgated the theories of Macrobius and Martianus Capella at the court of Charles the Bald, and wrote a mammoth philosophical work titled Periphyseon of half a million words. The latter is now being published slowly in English by the Irish Government, who have decided that Erigena (which means 'Irish-born') was one of their great native sons.

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and they had better make the most of him. Alas. If only Proclus too had been born in Ireland. Perhaps this is the only way to get these things into print – or even into English. Can't someone invent some more little countries looking for famous sons, and then allocate the sons? That way we might have something of a cultural revival. The Renaissance was due to the rediscovery of the Platonic tradition by the Florentines. When will we discover it?

This Appendix was conceived, researched, and written after the manuscript of the book had already been accepted for publication. It therefore suffers from tenuous treatment and scanty attire. But perhaps a little Proclus is better than none at all. In a desert no one gainsays a drop of water.

#### Notes

- 1 Elements of Theology, ed. and trans. by E. R. Dodds, Oxford, 1963.
- 2 Commentary on the First Book of Euclid's Elements, trans. by Professor Glenn Morrow. Princeton University Press, 1970.
- 3 Commentary on the First Alcibiades of Plato, trans. by W. O'Neill, The Hague, 1965.
- 4 Corpus Platonicum Medii Aevi Series, ed. by R. Klübansky; Vol. II. of Plato Latinus (Parmenides, Proclus in Parmenidem). Includes English translation by G. E. M. Anscombe and L. Labowsky. Warburg Institute, London, 1953. Obtainable as Kraus Reprint, Nendeln, Liechtenstein, 1973.
- 5 See Bibliography. Ref. page 400.
- 6 The Cambridge History of Later Greek & Early Mediaeval Philosophy. ed. by A. H. Armstrong, Cambridge, 1970.
- 7 There is a Life of Proclus written by his student and successor Marmus. It was translated by Thomas Taylor and appears in Volume I of The Philosophica. and Mathematica. Commentaries of Proclus on the First Book of Euclid's Elements, London, 1792. A more recent publication of it in English may be found in The Philosophy of Proclus by L. J. Rosan, Cosmos, New York, 1949.

8 Hellenistic Religions ed. by F. C. Grant, in Library of Liberal Arts series, Bobbs-Merrill Indianapolis and New York, 1953. English translations of four hymns by Proclus are found on pp. 170-2. (In all, seven hymns and a fragment of an eighth by Proclus survive today.)

9 In vol. V of Plutarch's *Morals*, ed. by W. W. Goodwin, Boston, 1874. The translation of 'Platonic Questions' is by R. Brown and on pp. 425-49.

10 History of Science, see note 16, page 159.

11 See Life of Xenocrates in Diogenes Laertius, *Lives of Eminent Philosophers*, 2 vols. trans. by R. D. Hicks, Loeb Library series. Heinemann, London, Harvard University Press, U.S.A., 1966.

12 Translation included in the same volume as in note 9 above. Also in Loeb Library.

13 Three short complete works of Kepler are in English: *Kepler's Dream*, trans. with full text and notes, of *Somnium, Sive Astronomia Lunaris*, by John Lear and P. F. Kirkwood, University of California Press, Berkeley and Los Angeles, 1965. *Kepler's Conversation with Galileo's Sidereal Messenger*, trans. by Edward Rosen, no. 5 of 'Sources of Science' series, Johnson Reprint Corp., London and New York, 1965. Also there is a brief treatise by Kepler on the Six-Cornered Snowflake, trans. by Colin Hardie and L. L. Whyte, Oxford University Press, 1965. Two chapters (IV and V) of Kepler's *Epitome of Copernican Astronomy* and one chapter (V) of his *Harmonies of the World* are in English, trans. by C. G. Wallis in vol. 16, *Ptolemy, Copernicus, Kepler of the Great Books of the Western World* series, Encyclopaedia Britannica, Inc., Chicago, London, Toronto, 1952. A second translation of *Kepler's Dream* has appeared: *Kepler's Somnium*, trans. and commentary by Edward Rosen, University of Wisconsin Press, 1967.

14 See previous note.

15 The *Cratylus*, *Phaedo*, *Parmenides* and *Timaeus* with notes on the *Cratylus*, English trans. of Plato by Thomas Taylor with notes, London, 1793. The quotation is from p. 388, in Taylor's

## APPENDIX I

247

Introduction to the *Timaeus*. The copy of this book which I consulted once belonged to the poet Percy Bysshe Shelley and may be found in the Shelley collection at the Bodleian Library in Oxford.

16 Preserved and trans. in Cory, *Ancient Fragments*, 2nd ed., p. 320.

17 Marinus, in his *Life of Proclus*, tells us that Proclus was twenty-eight years old when he wrote *In Tim.*, which gives the date A.D. 438 at beginning of appendix.

18 I did not think it right to take space here to enter into a full discussion of the generally ignored ancient heliocentric theories of Macrobius, Martianus Capella, Julian the Emperor (Apostate), Nicholas of Cusa, and so on. As an example of this tradition (which Proclus

mentioned and rejected, mistakenly thinking that Plato had done so), I quote a passage from the Fourth Oration (to Helios) of the Emperor Julian the Apostate, 146 C D, which may be found in the Loeb Library series, which publishes the works of Julian in three vols 'For it is evident that the planets, as they dance in a circle about (the Sun), preserve as the measure of their motion a harmony between this god and their own movements. . . To the Greeks what I say is perhaps incomprehensible as though one were obliged to say to them only what is known and familiar' This indicates a distinctly esoteric tradition which was imbibed from Julian's friend and teacher the Neoplatonist Iamblichus, a predecessor of Proclus For just before this passage, Julian had said: Iamblichus of Chalcis, who through his writings initiated me not only into other philosophic doctrines but these also (he is) by no means inferior to (Plato) in genius I also refer the reader to 135 B of the same oration by Julian for further exposition of Julian's heliocentric ideas, all of which we may treat as fragments of lost writings of Iamblichus I also suggest consulting Thomas Whittaker's Macrobius, Cambridge, 1923 On page 75 we find him summarizing Macrobius's beliefs 'Mercury and Venus (have) orbits in which they follow the sun as satellites' Unfortunately no works of Martianus Capella exist in English

## SUMMARY

### WHAT PROCLUS KNEW

- 1 The Ptolemaic theory of the heavens is totally wrong
- 2 The moon is made of 'earth' which is placed in a celestial situation, hence 'celestial earth'
- 3 The planets themselves revolve, rather than their 'spheres' They do so 'within their spheres (or orbits)
- 4 The stars all rotate on their own axes
- 5 The planets all rotate on their own axes
- 6 The planets become more remote from and nearer to the earth in their revolutions
- 7 The heavens contain all the four elements in varying proportions but tend to do so according to a fiery mode The 'fire' in the stars is different from earthly fire and is more properly 'energy' (Earthly fire is a dark and debased form of true fire or as Proclus expresses it: 'the dregs and sediment of fire' )
- 8 The heliocentric theory of Heraclides Ponticus is mentioned by Proclus, but rejected by him on the grounds that Plato rejected it (Although we know from Theophrastus that Plato did accept it when old, Proclus did not know this )
- 9 The planets have invisible satellites which revolve around them
- 10 Certain fixed stars have invisible satellites too.

- .1 These invisible orbitings are as important as the visible ones to us, and can 'enable us to commence the contemplation of celestial bodies
- .2 Each planet or star is a world'
- .3 Proclus was initiated into the Egyptian and Babylonian mysteries and would thus have known about the Sirius mystery

## APPENDIX II

### The Surviving Fragments of Berossus, in English Translation

Note The following fragments are published here for the first time since 1876 in order to make them readily available to the reader. Regrettably, the original Greek text is not here included, but may be found in Cory, The Ancient Fragments (for which, see Bibliography)

These ancient fragments give accounts of the Babylonian tradition that civilization was originally founded by amphibious beings known as Oannes, Musari, or Annedoti (in Greek). This tradition is in striking agreement with the Dogon tradition of the amphibious Nommos, or Monitors, who came from the system of Sirius to found civilization on earth.

### FRAGMENT OF BEROSSUS

#### FROM APOLLODORUS

##### Of the Chaldaean Kings

This is the history which Berossus has transmitted to us. He tells us that the first king was A.orus of Babylon a Chaldaean, he reigned ten sari and afterwards A.aparus, and Amelon who came from Pantibiblon: then Ammenon the Chaldaean, in whose time appeared the Musarus Oannes the Annedotus from the Erythraean sea. (But Alexander Polyhistor anticipating the event, has said that he appeared in the first year: but Appollodorus says that it was after forty sari. Abydenus, however, makes the second Annedotus appear after twenty-six sari.) Then succeeded Megaarus from the city of Pantibiblon, and he reigned eighteen sari and after him Daonus the shepherd from Pantibiblon reigned ten sari, in his time (he says) appeared again from the Erythraean sea a fourth Annedotus, having the same form with those above, the shape of a fish blended with that of a man. Then reigned Euedoreschus from Pantibiblon for the term of eighteen sari in his days there appeared another personage from the Erythraean sea like the former, having the same complicated form between a fish and a man, whose name was Odacon. (All these, says Apollodorus, related particularly and circumstantially whatever Oannes had informed them of: concerning these Abydenus has made no mention.) Then



reigned Amempsinus, a Chaldaean from Laranchae; and he being the eighth in order reigned ten sari. Then reigned Otiartes, a Chaldaean, from Laranchae;

appendix II

249

and he reigned eight sari. And upon the death of Otiartes, his son Xisuthrus reigned eighteen sari. in his time happened the great deluge. So that the sum of all the kings is ten; and the term which they collectively reigned an hundred and twenty sari. Syncel. Chron. 39. Euseb. Chron. 5.

## FRAGMENTS OF BEROSSUS

### FROM ABYDENUS

#### Of the Chaldaean Kings and the Deluge

So much concerning the wisdom of the Chaldaeans

It is said that the first king of the country was Alorus, who gave out a report that he was appointed by God to be the Shepherd of the people. he reigned ten sari. now a sari is esteemed to be three thousand six hundred years, a neris six hundred, and a sossus sixty.

After him Alaparus reigned three sari. to him succeeded Amillarus from the city of Pantibiblon, who reigned thirteen sari, in his time a semidaemon called Ammedotus, very like to Oannes, came up a second time from the sea. after him Ammenon reigned twelve sari, who was of the city of Pantibiblon. then Megarus of the same place eighteen sari. then Daos, the shepherd, governed for the space often sari, he was of Pantibiblon, in his time four double-shaped personages came out of the sea to land, whose names were Euedocus, Eueugamus, Eueuboulus, and Aneumentus. after these things was Anodaphus, in the time of Euedoreschus. There were afterwards other kings, and last of all Sisithrus. so that in the whole, the number amounted to ten kings, and the term of their reigns to an hundred and twenty sari. (And among other things not irrelative to the subject, he continues thus concerning the deluge.) After Euedoreschus some others reigned. and then Sisithrus. To him the deity Cronus foretold that on the fifteenth day of the month Desius there would be a deluge, and commanded him to deposit all the writings whatever that he had, in the city of the Sun in Sippara. Sisithrus, when he had complied with these commands, instantly sailed to Armenia, and was immediately inspired by God. During the prevalence of the waters Sisithrus sent out birds, that he might judge if the flood had subsided. But the birds passing over an unbounded sea, and not finding any place of rest, returned again to Sisithrus. This he repeated. And when upon the third trial he succeeded, for they then returned with their feet stained with mud, the gods translated him from among men. With respect to the vessel, which yet remains in Armenia, it is a custom of the inhabitants to form bracelets and amulets of its wood. Syncel. 38. Euseb. Praep. Evan. lib. 9. Euseb. Chron. 5. 8.

Of the Tower of Babe.

They say that the first inhabitants of the earth, glorying in their own

250

## THE SIRIUS MYSTERY

strength and size, and despising the gods, undertook to raise a tower whose top should reach the sky, where Babylon now stands but when it approached the heaven, the winds assisted the gods, and overturned the work upon its contrivers. and its ruins are said to be at Babylon and the gods introduced a diversity of tongues among men who till that time had all spoken the same language and a war arose between Cronus and Titan. but the place in which they built the tower is now called Babylon, on account of the confusion of the tongues for confusion is by the Hebrews called Babel Euseb. Praep. Evan lib 9 Syncel Chron 44. Euseb. Chron. 13

## FRAGMENTS OF BEROSSUS

### FROM ALEXANDER POLYHISTOR

Of the Cosmogony and Causes of the Deluge

Berosus, in his first book concerning the history of Babylonia, informs us that he lived in the time of Alexander the son of Philip. And he mentions that there were written accounts preserved at Babylon with the greatest care, comprehending a term of fifteen myriads of years. These writings contained a history of the heavens and the sea, of the birth of mankind; also of those who had sovereign rule and of the actions achieved by them

And in the first place he describes Babylonia as a country which lay between the Tigris and Euphrates. He mentions that it abounded with wheat, barley, ocrus, sesamum and in the lakes were found the roots called gongae which were good to be eaten, and were in respect to nutriment like barley. There were also palm trees and apples, and most kinds of fruits, fish too and birds both those which are merely of flight, and those which take to the element of water. The part of Babylonia which is bordered upon Arabia, was barren, and without water but that which lay on the other side had hills and was fruitful. At Babylon there was (in these times) a great resort of people of various nations, who inhabited Chaldea, and lived without rule and order like the beast of the field.

In the first year there made its appearance, from a part of the Erythraean sea which bordered upon Babylonia, an animal endowed with reason, who was called Oannes. (According to the account of Apollodorus) the whole body of the animal was like that of a fish and had under a fish's head another

head, and also feet below, similar to those of a man, subjoined to the fish's tail. His voice too, and language, was articulate and human, and a representation of him is preserved even to this day.

This Being in the day-time used to converse with men, but took no food at that season, and he gave them an insight into letters and sciences, and every kind of art. He taught them to construct houses, to found temples, to compile laws, and explained to them the principles of geometrical knowledge. He made them distinguish the seeds of the earth, and shewed them how to collect fruits. In short, he instructed them in every thing which could tend to soften manners and humanize mankind. From that time, so universal were his instructions,

appendix II

25.

nothing has been added material by way of improvement. When the sun set, it was the custom of this Being to plunge again into the sea, and abide all night in the deep, for he was amphibious.

After this there appeared other animals like Oannes, of which Berossus promises to give an account when he comes to the history of the kings.

Moreover Oannes wrote concerning the generation of mankind, of their different ways of life, and of their civil polity, and the following is the purport of what he said.

'There was a time in which there was nothing but darkness and an abyss of waters, wherein resided most hideous beings, which were produced of a two-fold principle. Men appeared with two wings, some with four and with two faces. They had one body but two heads, the one of a man, the other of a woman. They were likewise in their several organs both male and female. Other human figures were to be seen with the legs and horns of goats. Some had horses' feet; others had the limbs of a horse behind, but before were fashioned like men, resembling hippocentaurs. Bulls likewise bred there with the heads of men; and dogs with fourfold bodies, and the tails of fishes. Also horses with the heads of dogs, men too and other animals, with the heads and bodies of horses and the tails of fishes. In short, there were creatures with the limbs of every species of animals. Add to these fishes, reptiles, serpents, with other wonderful animals, which assumed each other's shape and countenance. Of all these were preserved delineations in the temple of Belus at Babylon.

'The person, who was supposed to have presided over them, was a woman named Omoroca, which in the Chaldaic language is Thalath, which the Greeks express Thalassa, the sea, but according to the most true computation, it is equivalent to Selene, the moon. All things being in this situation, Belus came, and cut the woman asunder, and out of one half of her he formed the earth, and of the other half the heavens, and at the same time destroyed the animals in the abyss. All this (he says) was an allegorical description of nature. For the whole universe consisting of moisture, and animals being continually generated

therein, the deity (Belus) above-mentioned cut off his own head upon which the other gods mixed the blood, as it gushed out, with the earth, and from thence men were formed. On this account it is that they are rational, and partake of divine knowledge. This Belus, whom men call Dis, divided the darkness, and separated the Heavens from the Earth, and reduced the universe to order. But the animals so lately created, not being able to bear the prevalence of light, died. Belus upon this, seeing a vast space quite uninhabited, though by nature very fruitful, ordered one of the gods to take off his head; and when it was taken off, they were to mix the blood with the soil of the earth and from thence to form other men and animals, which should be capable of bearing the light. Belus also formed the stars, and the sun, and the moon, together with the five planets' (Such are the contents of the first book of Berossus.)

(In the second book was the history of the ten kings of the Chaldeans, and the periods of each reign which consisted collectively of an hundred and twenty sari, or four hundred and thirty-two thousand years reaching to the time of the Deluge. For Alexander, following the writings of the Chaldeans, enumerating the kings from the ninth Ardates to Xisuthrus, who is called by them the tenth, proceeds in this manner.)

After the death of Ardates, his son Xisuthrus succeeded, and reigned eighteen sari. In his time happened the great Deluge; the history of which is given in this manner. The Deity, Cronus, appeared to him in a vision, and gave him notice that upon the fifteenth day of the month Daesius there would be a flood, by which mankind would be destroyed. He therefore enjoined him to commit to writing a history of the beginning, procedure, and final conclusion of all things, down to the present term, and to bury these accounts securely in the city of the Sun at Sippara, and to build a vessel, and to take with him into it his friends and relations, and to convey on board every thing necessary to sustain life, and to take in also all species of animals, that either fly or rove upon the earth; and trust himself to the deep. Having asked the Deity, whither he was to sail? he was answered, "To the Gods" upon which he offered up a prayer for the good of mankind. And he obeyed the divine admonition, and built a vessel five stadia in length, and two in breadth. Into this he put every thing which he had got ready, and last of all conveyed into it his wife, children, and friends. After the flood had been upon the earth, and was in time abated, Xisuthrus sent out some birds from the vessel, which not finding any food, nor any place to rest their feet, returned to him again. After an interval of some days, he sent them forth a second time; and they now returned with their feet tinged with mud. He made a trial a third time with these birds, but they returned to him no more. From whence he formed a judgment, that the surface of the earth was now above the waters. Having therefore made an opening in the vessel, and finding upon looking out, that the vessel was driven to the side of a mountain, he immediately quitted it, being attended by his wife, his daughter, and the pilot. Xisuthrus immediately paid his adoration to the earth.

and having constructed an altar, offered sacrifices to the gods. These things being duly performed, both Xisuthrus and those who came out of the vesSEL with him disappeared. They, who remained in the vessel finding that the others did not return, came out with many lamentations, and called continually on the name of Xisuthrus. Him they saw no more; but they could distinguish his voice in the air and could hear him admonish them to pay due regard to the gods and likewise inform them that it was upon account of his piety that he was translated to live with the gods that his wife and daughter, with the pilot, had obtained the same honour. To this he added that he would have them make the best of their way to Babylonia, and search for the writings at Sippara, which were to be made known to all mankind and that the place where they then were was the land of Armenia. The remainder having heard these words, offered sacrifices to the gods and taking a circuit, journeyed towards Babylonia.

The vesSEL, being thus stranded in Armenia, some part of it yet remains in the Corcyraean\* mountains in Armenia, and the people scrape off the bitumen, with which it had been outwardly coated, and make use of it by way of an alexipharmac and amulet. In this manner they returned to Babylon, and having found the writings at Sippara, they set about building cities, and erecting temples and Babylon was thus inhabited again. Syncel Chron. 28. Euseb Chron. 5. 8.

\* Or Cordyeon mountains—Corduorum montibus. Ea. Ar.

## APPENDIX II

253

### FRAGMENTS OF BEROSSUS

#### FROM JOSEPHUS, ETC.

##### Of Abraham

After the deluge, in the tenth generation, was a certain man among the Chaldaeans renowned for his justice and great exploits, and for his skill in the celestial sciences. Euseb Praep. Evan. lib. 9.

##### Of Nabonassar

From the reign of Nabonassar only are the Chaldaeans (from whom the Greek mathematicians copy) accurately acquainted with the heavenly motions. for Nabonassar collected all the mementos of the kings prior to himself, and destroyed them, that the enumeration of the Chaldaean kings might commence with him. Syncel Chron. 207.

##### Of the Destruction of the Jewish Temple

He (Nabopolassar) sent his son Nabuchodonosor with a great army against Egypt, and against Judea, upon his being informed that they had revolted from

him and by that means he subdued them all and set fire to the temple that was at Jerusalem, and removed our people entirely out of their own country, and transferred them to Babylon, and it happened that our city was desolate during the interval of seventy years, until the days of Cyrus king of Persia (He then says, that) this Babylonian king conquered Egypt, and Syria, and Phoenicia and Arabia, and exceeded in his exploits all that had reigned before him in Babylon and Chaldaea Joseph, contr. Appion. lib. 1 c. 19

#### Of Nebuchadnezzar

When Nabopolassar his (Nabuchodonosor's) father, heard that the governor, whom he had set over Egypt, and the parts of Coelesyria and Phoenicia, had revolted, he was unable to put up with his delinquencies any longer, but committed certain parts of his army to his son Nabuchodonosor, who was then but young, and sent him against the rebel and Nabuchodonosor fought with him, and conquered him, and reduced the country again under his dominion. And it happened that his father, Nabopolassar, fell into a distemper at this time and died in the city of Babylon, after he had reigned twenty-nine years

After a short time Nabuchodonosor receiving the intelligence of his father's death, set the affairs of Egypt and the other countries, in order, and committed the captives he had taken from the Jews, and Phoenicians, and Syrians, and of the nations belonging to Egypt, to some of his friends, that they might conduct that part of the forces that had on heavy armour, with the rest of his baggage, to Babylonia, while he went in haste, with a few followers, across the desert to Babylon where, when he was come, he found that affairs had been well conducted by the Chaldaeans, and that the principal person among them had preserved the kingdom for him Accordingly he now obtained

possession of all his father's dominions And he ordered the captives to be distributed in colonies in the most proper places of Babylonia and adorned the temple of Belus, and the other temples, in a sumptuous and pious manner out of the spoils he had taken in this war He also rebuilt the old city, and added another to it on the outside, and so far restored Babylon, that none, who should besiege it afterwards, might have it in their power to divert the river, so as to facilitate an entrance into it and thus he did by building three walls about the inner city, and three about the outer Some of these walls he built of burnt brick and bitumen, and some of brick only When he had thus admirably fortified the city with walls, and had magnificently adorned the gates, he added also a new palace to those in which his forefathers had dwelt, adjoining them, but exceeding them in height, and in its great splendor It would perhaps require too long a narration, if any one were to describe it however, as prodigiously large and magnificent as it was, it was finished in fifteen days In this palace he erected very high walks, supported by stone pillars and by planting what was called a pensile paradise, and replenishing it with all sorts of trees, he rendered

the prospect an exact resemblance of a mountainous country. This he did to please his queen, because she had been brought up in Media, and was fond of a mountainous situation. Joseph. contr. Appion lib. i. c. 19. Synce. Chron. 220. Euseb. Praep. Evan. lib. 9.

#### Of the Chaldaean Kings after Nebuchadnezzar

Nabuchodonosor, after he had begun to build the above-mentioned wall fell sick, and departed this life, when he had reigned forty three years, whereupon his son Evilmerodachus obtained the kingdom. He governed public affairs in an illegal and improper manner, and by means of a plot laid against him by Nerig.issorus, his sister's husband, was slain when he had reigned but two years.

Upon his death Nerig.issorus, who had conspired against him, succeeded him in the kingdom, and reigned four years.

His son Laborosoarchodus inherited the kingdom though he was but a child, and kept it nine months. but by reason of the evil practices he exhibited, a plot was laid against him by his friends, and he was tortured and killed.

After his death, the conspirators assembled, and by common consent put the crown upon the head of Nabonnedus, a man of Babylon. and one of the leaders of that insurrection. In his reign it was that the walls of the city of Babylon were curiously built with burnt brick and bitumen.

But in the seventeenth year of his reign, Cyrus came out of Persia with a great army, and having conquered all the rest of Asia, he came hastily to Babylonia. When Nabonnedus perceived he was advancing to attack him, he assembled his forces and opposed him, but was defeated, and fled with a few of his attendants, and was shut up in the city Borsippus. Whereupon Cyrus took Babylon, and gave orders that the outer walls should be demolished, because the city had proved very troublesome to him, and difficult to take. He then marched to Borsippus, to besiege Nabonnedus, but as Nabonnedus delivered himself into his hands without holding out the place, he was at first kindly treated by Cyrus, who gave him an habitation in Carmania, but sent

#### APPENDIX II

255

him out of Babylonia. Accordingly Nabonnedus spent the remainder of his time in that country. and there died. Joseph. contr. App. lib. 1. c. 20. Euseb. Praep. Evan. lib. 10.

#### Of the Feast of Sacea

Berosus, in the first book of his Babylonian history. says. That in the eleventh month, called Loos, is celebrated in Babylon the feast of Sacea for five days in which it is the custom that the masters should obey their domestics, one of

whom is led round the house, clothed in a royal garment, and him they call  
Zoganes. Athenaels, .ib 14

Fragment of Megasthenes

FROM ABYDENUS

Of Nebuchadnezzar

Abydenus, in his history of the Assyrians, has preserved the following fragment of Megasthenes, who says. That Nabucodrosorus, having become more powerful than Hercules, invaded Libya and Iberia, and when he had rendered them tributary he extended his conquests over the inhabitants of the shores upon the right of the sea. It is moreover related by the Chaldaeans, that as he went up into his palace he was possessed by some god and he cried out and said 'Oh' Babylonians, I, Nabucodrosorus, foretell unto you a calamity which must shortly come to pass, which neither Belus my ancestor, nor his queen Beltis, have power to persuade the Fates to turn away. A Persian mule shall come, and by the assistance of your gods shall impose upon you the yoke of slavery the author of which shall be a Mede, the foolish pride of Assyria. Before he should thus betray my subjects, Oh' that some sea or whirlpool might receive him, and his memory be blotted out for ever: or that he might be cast out to wander through some desert, where there are neither cities nor the trace of men, a solitary exile among rocks and caverns, where beasts and birds alone abide. But for me, before he shall have conceived these mischiefs in his mind, a happier end will be provided.'

When he had thus prophesied, he expired. and was succeeded by his son Evilmaruchus, who was slain by his kinsman Neriglissares. and Neriglissares left Labassoarsesus his son. and when he also had suffered death by violence, they made Nabonidochus king. being no relation to the royal family, and in his reign Cyrus took Babylon, and granted him a principality in Carmania.

And concerning the rebuilding of Babylon by Nabuchodonosor, he writes thus. It is said that from the beginning all things were water, called the sea (Thalath?) that Belus caused this state of things to cease, and appointed to each its proper place. and he surrounded Babylon with a wall. but in process of time this wall disappeared. and Nabuchodonosor walled it in again, and it remained so with its brazen gates until the time of the Macedonian conquest.

And after other things he says. Nabuchodonosor having succeeded to the kingdom, built the walls of Babylon in a triple circuit in fifteen days and he turned the river Armacale, a branch of the Euphrates, and the Acracanus. and above the city of Sippara he dug a receptacle for the waters, whose



perimeter was forty parasangs, and whose depth was twenty cubits, and he placed gates at the entrance thereof, by opening which they irrigated the plains, and these they call Echetognomones (sluices). and he constructed dykes against the irruptions of the Erythraean sea, and built the city of Teredon against the incursions of the Arabs, and he adorned the palace with trees, calling them hanging gardens. Euseb Praep Evan lib. 10. Euseb Chron. 49

#### Fragment of Julian the Emperor

(reigned a.d. 360-3)

From Cyril's Contra Julianum V, 176 (Migne), we have this fragment of Julian's lost work Against the Christians

That God, however, has not cared for the Hebrews only, but rather that in His love for all nations He hath bestowed on the Hebrews nothing worth very serious attention, whereas He has given us far greater and superior gifts, consider from what will follow. The Egyptians, counting up of their own race the names of not a few sages, can also say they have had many who have followed in the steps of Hermes. I mean of the Third Hermes who used to come down to them in Egypt. The Chaldaeans also can tell of the disciples of Oannes and of Belus, and the Greeks of tens of thousands who have the Wisdom from Cheiron. For it is from him that they derived their initiation into the mysteries of nature, and their knowledge of divine things, so that indeed in comparison the Hebrews seem only to give themselves airs about their own attainments.

This translation (with some gaps supplied) may be found in G. R. S. Mead's Thrice Greatest Hermes, vol. II., page 199 (1964)

appendix II 257

out of a great egg whence his name, and that he was actually a man, but only seemed a fish because he was clothed in the skin of a sea creature

I am indebted to Kenneth Demarest for bringing attention to this obscure fragment from the Byzantine Patriarch Photius in his essay 'The Winged Power'. I also quote a portion of his own remarks following it

Helladius' account is extremely valuable, the more so because it is confirmed by the extant pictorial representations of this wise being (called 'the Egg-Born') who exited in a strange suit from some kind of vessel likened to an egg that fell into the sea. Hyginus, Manilius and Xanthus also furnish other corroborating details, speaking of gods in honor of whom the fish-form is sacred, who plunged from the sky into the waters of the Euphrates. In another variant (found in the commentary in Germanicus' edition of Aratus) the power of a holy fish pushed ashore on the banks of the Euphrates near Babylon, the egg out of which the deity appeared

Before it landed in the waters, the egg-like vessel was of a luminous appearance. Thus the historian Sozomen tells us that the same type of deity descended into the Euphrates as a fiery star from the sky. Just as these visitant capsules in the water were remembered as 'eggs' from which higher men in fish-garb emerged, so the capsules, when they were in the sky, were metaphorically described as great fiery birds or griffons—or, again, as winged figures or deific men flying in a winged ring or capsule. 'Space visitors' we would call them today.

Fragment of Helladius  
PRESERVED BY PHOTIUS

(C. A. D. 820-C. 893)

PRESERVED IN THE FORM OF A SUMMARY  
(Codex 279)

(Helladius) recounts the story of a man named Oe who came out of the Red Sea having a fish-like body but the head, feet and arms of a man, and who taught astronomy and letters. Some accounts say that he came

## APPENDIX III

259

## APPENDIX III

### Why Sixty Years?

The Sigu ceremony of the Dogon is celebrated every sixty years. What precedents for such a period of time, given religious importance, are to be found in the ancient world?

The Egyptians had such a period associated with Osiris. 1 We also find the sixty year period reduplicated by them in a manner familiar from the reduplications of the fifty year period of Sirius B, and also in the Dogon custom of speaking of uniting two Sigu. 'The henti period consisted of two periods, each containing sixty years.' And this period is described in a Hymn to Osiris. 2 '... most terrible is his name of "Asar" (Osiris). The duration of his existence is an eternal henti period in his name of "Un-Nefer".'

The henti period may, by pun, have had some association with the phallus, henn. I only suggest this because of the connection of circumcision with the Sigu ceremonies of the Dogon. It is pure speculation. Henti is also a title of Osiris, presumably arising from the fact that the duration of Osiris's existence is said to be 'an eternal henti period'.

My own predilection, when considering the period of sixty years, is to think in terms of a synchronization of the orbital periods of the two planets Jupiter and Saturn, for these come together in nearly sixty years. The orbital period of Jupiter is approximately twelve years and that of Saturn approximately thirty years. Five times twelve is sixty and two times thirty is also sixty. Sixty years is the great period which brings into synchronization the movements of the two great outer planets which can be seen by the eye. I have no doubt that this sixty year period has been of considerable importance in ancient times, and the sharp-eyed Egyptians would have been well aware of it.

In speaking of the revolutions of Jupiter and Saturn, the Neoplatonist philosopher Olympiodorus has written: "That of Jupiter is effected in twelve years. And that of Saturn is completed in thirty years. The stars, therefore, are not conjoined with each other in their revolutions except rarely. Thus, for instance, the sphere of Saturn and the sphere of Jupiter are conjoined with each other in their revolutions, in sixty years. For if the sphere of Jupiter comes from the same to the same in twelve years, but that of Saturn in thirty years, it is evident that when Jupiter has made five, Saturn will have made two revolutions: for twice thirty is sixty, and so likewise is twelve times five, so that their revolutions will be conjoined in sixty years. Souls, therefore, are punished for such like periods."

These observations of Olympiodorus, from his Commentary on Plato's Gorgias in the form of scholia, are cited by Thomas Taylor as comment on a

passage by Apuleius (best known as author of The Golden Ass) in one of his Platonic essays: "For in order that the measures and revolutions of times might be known, and that the convolutions of the world might be visible, the light of the sun was enkindled, and vice versa, the opacity of night was invented, in order that animals might obtain the rest which they naturally desire. Month likewise was produced, when the moon, having completed the revolution of her orb, returns to the same place from whence she departed. And the spaces of the year were terminated when the sun had passed through the four vicissitudes of the seasons, and arrived at the same sign. And the numerations of these circulations, returning into, and proceeding from, themselves, was discovered by the exercise of the reasoning power. Nevertheless, there are certain circuits of the stars, which perpetually observe a legitimate course, but which the sagacity of men can scarcely comprehend. The supreme of all of them (is that of the fixed stars) the second is given to Saturn, the third to Jupiter." This esoteric cycle conjoining the motions of Saturn and Jupiter would have seemed of immense importance to all ancient astronomers who had a good grasp of their subject. A cycle of sixty years is so long that no single person can live long enough to verify its recurrence a second time. The knowledge of such a cycle required a continuing tradition of observation which implies a priesthood with astronomical inclinations. The discovery and verification over more than one generation of an esoteric cycle joining the two great outer planets would appear as exciting to the ancient priests as discovering DNA has been to modern biochemists. To 'crack' the mysteries of the motions

of the two outer planets is quite an achievement. No wonder, then, that the Dogon maintain that a priest who 'united two Sigi' is really rather special. Apart from the fact that no one lives 120 years very easily, and thus 'uniting two Sigi' is accepted as having celebrated two Sigi ceremonies in a lifetime, the reduplication of the cycle may be taken to signify that only by checking to see if it happens a second time can the cycle be verified. To unite two of the cycles is to achieve a henti, which we have just seen the Egyptians describe both as '120 years' and as 'eternal'. How can 120 years be 'eternity'? This can be so when eternity is seen to consist of a cyclical construction. In other words, eternity is not a straight line to infinity but is rather an endless series of coils of the same size compressed into a great spring, known as time, and with the impetus of happening.

By chance, I found in an extremely obscure old book<sup>5</sup> from early in the nineteenth century a reference to a sixty-year period in the ancient world. The book is primarily a meandering of speculations concerning Stonehenge and British stone circles. It points out that Stonehenge has sixty stones in its outer circle. Then we read: "(this) outer circle is the oriental cycle of Vrihaspati, 60'.<sup>6</sup> The author later adds: "The great temple of Rolrich, in Oxfordshire,<sup>8</sup> is surrounded with 60 upright stones, the cycle of Vrihaspati, an example not far distant from the others. Later the author adds: "the number 60 is the base of the famous cycle called the Saros of 3,600 years of the Chaldees or Culdees of Babylon" and he mentions also that it is the decimal part of the 600-year cycle of the Neros period from the ancient Near East. But as for the 'famous Indian cycle of Vrihaspati' he seems upset that Indian brahmans explained it 'by saying that it arose from 5 revolutions of the planet Jupiter', "

Passing beyond our quaint old source book, we may investigate this rumoured Indian cycle of Vrihaspati. We soon discover that it does indeed exist in Indian tradition, where it is more properly known as that of Brihaspati. The name Brihaspati (or Vrihaspati) is the name of the planet Jupiter in Sanskrit, and the cycle which takes its name from this planet is a 60-year cycle.

Looking further into the matter of Brihaspati, I discovered that a Brihaspati cakra has two specific meanings: the Hindu cycle of sixty years, and also 'a particular astrological diagram'. I have not been able to locate a design of this diagram. But the fact that such a diagram exists indicates to me even further that the coincidence of five orbits of Jupiter with two of Saturn may be intended here. For it is by means of a particular astrological diagram that one traditionally computes the relative positions of Saturn and Jupiter. I reproduce two such diagrams in Figures 41 and 42. These diagrams were prepared by Johannes Kepler, discoverer of our three laws of Planetary Motion, and whom I discussed slightly in Appendix I 10.

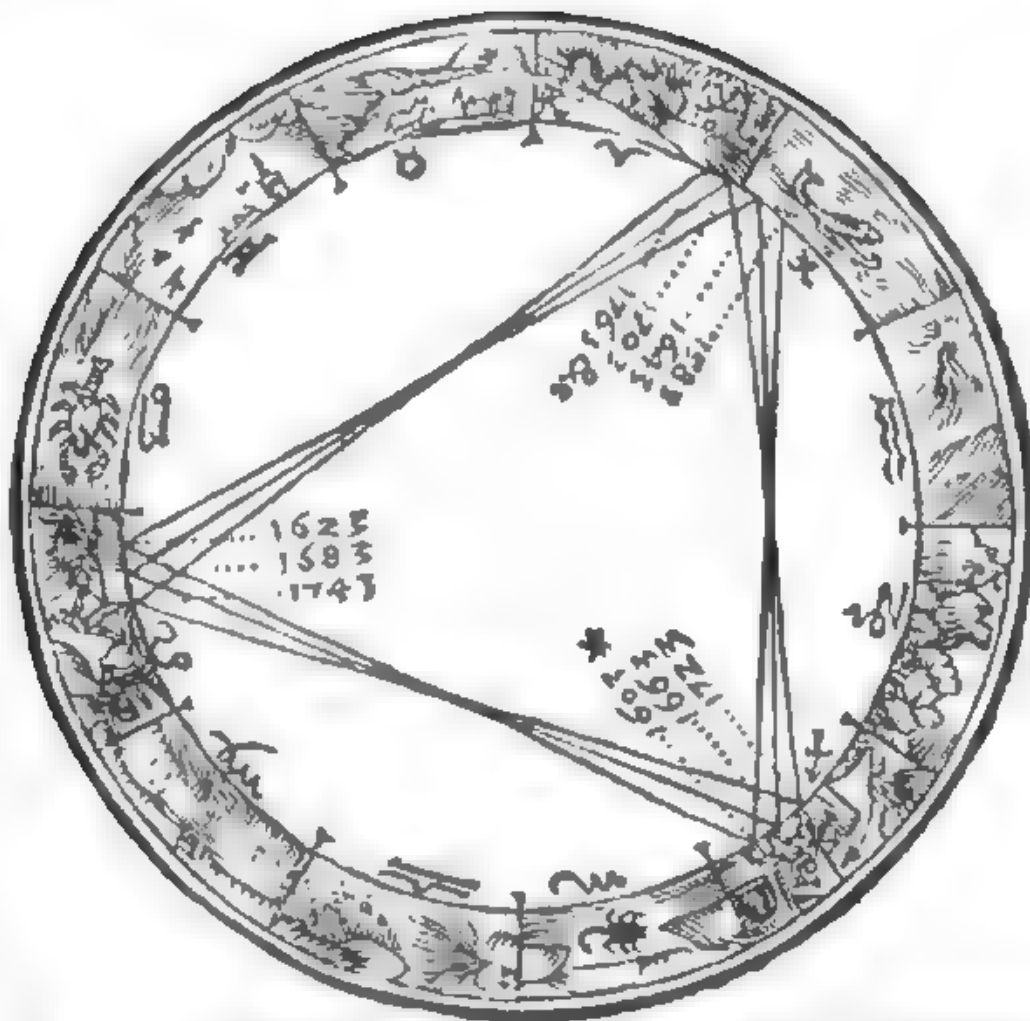
In reference to these very diagrams, Santillana and von Dechend tell us in

Hamlet's M.II,11 'A "mighty conjunction" thus corresponds to the revolution of one angle or corner of the trigon of Jupiter-Saturn conjunctions built up in sixty years (more correctly 59.6 years) through the whole zodiac. And further: ' (in) Greece, where we have besides the wrestling of Kronos and Saturn at Olympia also the Daidalia, held in the interval of sixty years sixty year cycles in India, or in the West Sudan, are not likely to be understood, if the scholars prefer to inhibit the trigon of the Saturn-Jupiter conjunction. ' And this trigon must be diagrammatically presented

We thus see that Santillana and von Dechend specifically identify sixty year cycles of the West Sudan, where the Dogon live, with the Jupiter-Saturn synchronism over sixty years. This was not known to me when I assumed the same thing: the reader will appreciate that such a concurrence of opinion urged me to think this idea correct.

The Dogon associate a 60-year period with the creation of the world by Anma 12. In the light of this, it is interesting that in the Western astrological tradition Saturn 'gives the measures of creation to Jupiter specifically through the interconnection of their orbits in the way which we have been describing. Santillana and von Dechend explain this quite well 13 and Johannes Kepler's works *De Stella Nova* and *De Vero Anno* are relevant to the subject 14. See also Figures 41 and 42 for the diagrams by which Saturn gives the (temporal) measures of creation to Jupiter. There is a Great Conjunction of Jupiter and Saturn every twenty years, as the diagrams show. The Dogon seem to be aware of the 20-year subdivision of the 60-year period too. If the reader turns back to the Griaule and Dieterlen article which follows Chapter One of this book, and studies Figure 11 accompanying that article, as well as the text referring to it, he will see that the Sign 60-year computation is broken down into 20-year segments.

The act of circumcision, to the Dogon, symbolizes the orbit of Sirius B around Sirius A. It may well be, then, that such a tendency to use genital symbolism in connection with heavenly motions explains the 'castration' of Saturn by Jupiter in Greek mythology. Figure XII of the Griaule and Dieterlen article in this book records the 'mutuating domination of Sirius over the femininity



*Figure 41. A detailed illustration of the motions of the Iragon of Great Conjunctions from 1583 to 1753*

of Yasigui' In Le Renard Pale one reads a great deal about genital mutilation, castration, circumcisions, female circumcisions, and so on. These strange conceptions of genital violence associated symbolically to heavenly movements obviously came to the Dogon along with the rest of their ancient traditions, and survive as well in the Mediterranean region indigenously. The mutilation of Saturn by Jupiter, and the various creations which sprang from the resulting blood and seed, are of the same current of tradition as all the elements of a similar kind to be found among the Dogon, and which are related to these comparative orbitings of Saturn and Jupiter, as well as other heavenly bodies. The placenta comes back into the picture too. We have seen in the main text of the book that the placenta is the symbol, for the Dogon, of a planetary system, and the system of our sun and its planets is a placenta. It is therefore interesting

that the Dogon say that 60 is the count of the cosmic p.acentia. 15 For this specifically identifies the 60 years as a count defining our planetary system,

268

## THE SIRIUS MYSTERY

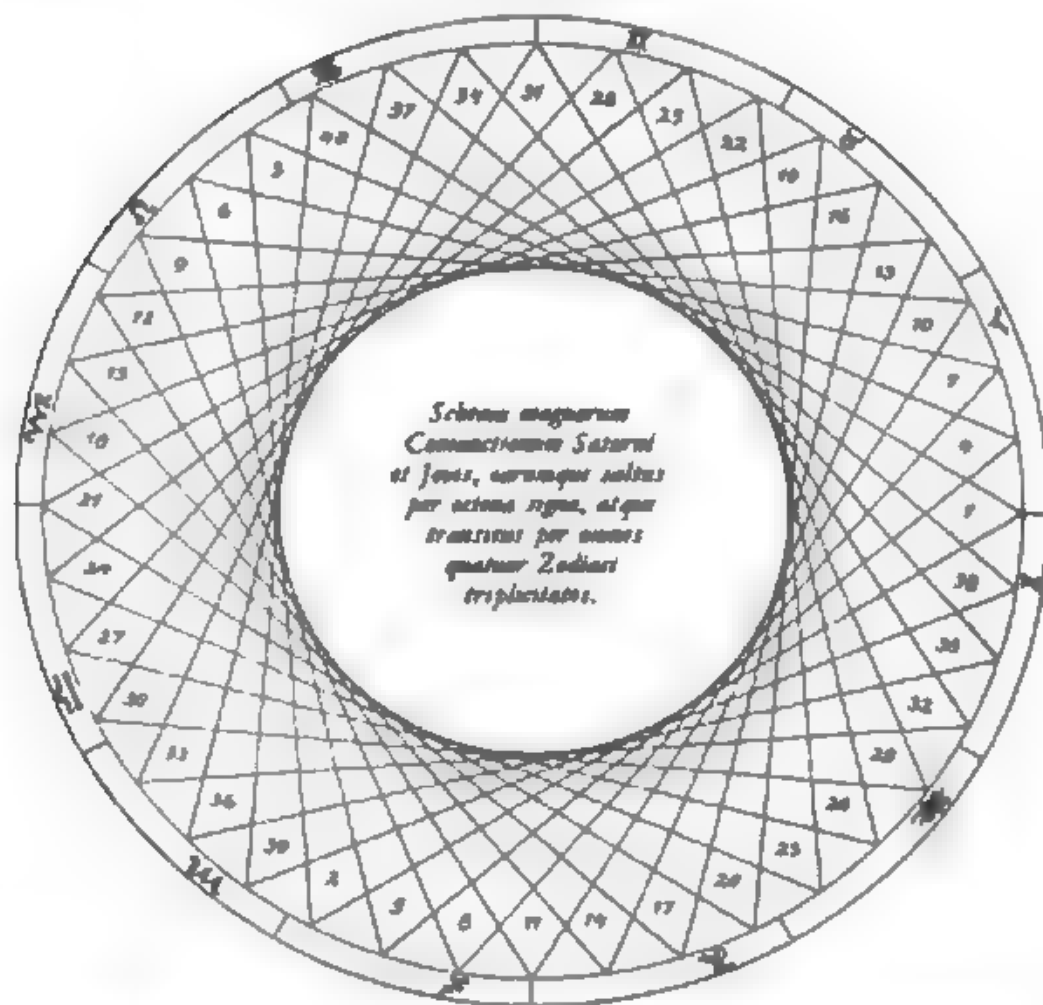


Figure 48. Scheme of the Great Conjunctions of Saturn and Jupiter, and their trap through the eighth sign and transit through all four of the triple Zodiac

and 60 years as the coordination between Saturn and Jupiter's movements can be seen as doing just that. For any system may be seen as defined by its boundaries, and as Saturn and Jupiter are recognized by the Dogon as their outermost planets for our system, their conjunction would strictly speaking

define our cosmic placenta, our solar system, for them. The Dogon even break 60 down themselves into '5 series of 12'16 and twice thirty, which seems a fairly specific indication that our hypothesis has a sound basis. For the last point, the drawing above the door of the Dogon sanctuary of Bmou17 reinforces these ideas. This drawing is used for the computation of the Sigui. Accompanying this drawing is a drawing of the Nommo which is broken down into two major portions: his right 'leg' marks the first thirty years and his left 'leg' the second thirty years. The legs are joined to represent that only taken together do these two thirty year periods have significance. And, as we know, Nommo did not actually have legs. He had a fish-tail extremity. The fact that each 'leg' represents

appendix II

263

a period of years is made quite clear by the information given that the left leg is made a little longer every year in such a way that it is the same length as the other (leg) by the time of the Sigui. This process recalls Plutarch's remark, noted much earlier in the book, that Zeus (Jupiter) had his legs joined together. In short, Jupiter's legs were joined together because each of his 'legs' represented one of the thirty year orbital periods of his father Saturn, and it was on his father that he stood. For Saturn upheld Jupiter's creation by providing him with the temporal measures, as Santalana and von Dechend explain.18 And the Dogon are the people who preserve this intricate tradition most fully which should not surprise us. They say that 60 is the 'number of the placenta', and indeed it is. Without 60 we could not define our solar system according to the traditional view of it and this traditional view is the one resting on the capabilities of observation, which is sensible. For us to define our system today by saying it is bounded by the motions of a tiny body called Pluto doesn't mean anything to anybody. For us to ground ourselves in the weighty and ponderous motions of those two observable planets Saturn and Jupiter, and define our solar system 'perhaps poetically' by their motions as extremities, we would be striking a deep chord in that music of the spheres of which we have all heard fanciful tales, but of which today we know nothing. But music which cannot be heard is not necessarily lost to the inner ear. Music, after all, is not necessarily audible sound. Harmony transcends the sensibly perceptive. The observance of a celestial harmony in the ancient cultures helped keep a sane perspective. To acknowledge the deep resounding bass of the 60-year cycle was the ultimate poetic myth of the solar system, expressed in that vast mythological fabric woven around all the heavenly bodies, a whole cloth binding together both man and planets in a cosmic unity which gave man dignity and meaning in a world whose periods and cycles he had defined and celebrated in his religious festivals. Even today we do this, but have lost consciousness of it; Easter is defined by the moon. But who notices that? The cosmic bodies make their silent music but we have stopped our ears. We do not wish to be integrally related to our cosmic environment by observances of the great motions above us. All the reader need do is to take the cotton wool out of his ears and listen. He will hear silence. And the cycles and periods of that silence are the beautiful music of the cosmos. But as long as we keep our ears stopped, we will be deafened by our inner noise and will have those tortured modern looks on our faces.



## Notes

- 1 Wallis Budge Osiris and the Egyptian Resurrection, op. cit , Vol II, p. 67
- 2 Ibid
- 3 From his Scholia Commentary to Plato's Gorgias, translated by Thomas Taylor, and given by Taylor in a footnote to Apuleius's essay on the Doctrines of Plato, On Natural Philosophy p 333 in the book cited in next note
- 4 Apuleius The Metamorphosis or Golden Ass and Philosophica Works, trans. by Thomas Taylor London, 1822 This book contains four of Apuleius's essays of which three are otherwise unobtainable in English translation, one is on 'The God of Socrates' and three are on the philosophy of Plato, the first of these three is relevant here; p 333-4. (The one on Socrates was also translated for Holm's library )

264

## THE SIRIUS MYSTERY

- 5 Higgins, Godfrey The Celtic Druids, London, 1827
- 6 Ibid , p 240
- 7 Ibid , p 241
- 8 The monument which Higgins calls Rolrich is now known as Rollright It is privately owned Anyone wishing to view it closely should contact the owner Pauline Flick, 1 Sparke's Cottages, Graham Terrace, London S W 1, England. The monument is Rollright Stones, at Little Rollright, Oxfordshire, England.
- 9 Higgins, op. cit p. 244
- 10 These figures come from Santillana and von Dechend, Hamlet's Mill op. cit and are found there opposite page 134 and opposite page 268
- 11 Ibid Appendix 23
- 12 Grixaile and Dieterlen, Le Renard Pale, op. cit pp 83-4
- 13 See Note 11
- 14 Ibid. These works of Kepler's are discussed by Santillana and von Dechend.
- 15 Le Renard Pale, p 177

.6 Ibid., p. 185

.7 See 'A Sudanese Sirius System' in this book

.8 See Note 11

#### APPENDIX IV

##### The Meaning of the E at Delphi.

Plutarch wrote a fascinating essay entitled 'The E at Delphi',<sup>1</sup> actually in the form of a dialogue, featuring Plutarch himself and several other speakers. It is to be remembered that Plutarch was a close personal friend of Clea, the Delphic priestess of his day, and he knew much and always sought to learn more about the nature and history of the oracles not only of Delphi but elsewhere as well. He was, however, most interested of all in Delphi itself, for he was one of the two priests of Apollo there.

The central subject of the discussion is the letter E which was a prominent inscription at the Delphic shrine. (That is, the letter E was carved in stone quite on its own at Delphi and was a subject of much curious speculation to the classical Greeks, who retained no tradition of the meaning of the ancient inscription of this single letter.) F. C. Babbitt, in his Introduction to the dialogue, says:<sup>2</sup>

Plutarch, in this essay on the E at Delphi, tells us that beside the well-known inscriptions at Delphi there was also a representation of the letter E, the fifth letter of the Greek alphabet. The Greek name for this letter was El, and this diphthong, in addition to being used in Plutarch's time as the name of E (which denotes the number five), is the Greek word for 'if, and also the word for the second person singular of the verb 'to be' (thou art).

In searching for an explanation of the unexplainable it is only natural that the three meanings of El ('five', 'if', 'thou art') should be examined to see if any hypothesis based on any one of them might possibly yield a rational explanation. Plutarch puts forward seven possible explanations of the letter. Attempts to explain the letter have been also made in modern times by Gottling and by Schultz. Roscher, C. Robert,

O. Lagercrantz, W. N. Bates, in the American Journal of Archaeology xxix (1925), pp. 239-46, tries to show that the E had its origin in a Minoan character E, later transferred to Delphi. Since the character was not understood, it, like other things at Delphi, came to be associated with Apollo. This character has been found on the old omphalos discovered in 1913 at Delphi in the temple of Apollo.

Interesting are the two coins reproduced in Imhoff Blumer and P. Gardner, A Numismatic Commentary on Pausanias, plate X nos. xxii and xxiii (text p. 149), which show the E suspended between the middle columns of

the temple. Learned scholars should note that the letter represented is E, not Ei, therefore such explanations as are based on the true diphthong are presumably wrong.

The second explanation offered by Plutarch is in fact the correct one. This is how Plutarch suggests it:

Ammonius smiled quietly, suspecting privately that Lamprias had been indulging in a mere opinion of his own and was fabricating history and tradition regarding a matter in which he could not be held to account. Someone else among those present said that all this was similar to the nonsense which the Chaldaean visitor had uttered a short time before: that there are seven vowels in the alphabet and seven stars that have an independent and unconstrained motion, that E is the second in order of the vowels from the beginning, and the sun the second planet after the moon, and that practically all the Greeks identify Apollo with the Sun.

The facts that Delphi is the second descending centre in the geodetic octave and that it is symbolized by the second vowel E, would seem to go well together. The seven vowels (each corresponding to one of the oracle centres) were uttered in succession as the holy 'unspeakable' name of God by Egyptian priests. Demetrius of Phalerum, the student of Aristotle's Lyceum and who founded the famous great library of Alexandria when later in life he was exiled to Egypt, tells us in his surviving treatise *On Style*: 'In Egypt the priests sing hymns to the gods by uttering the seven vowels in succession, the sound of which produces as strong a musical impression on their hearers as if flute and lyre were used.'

In Chapter XVI of *The White Goddess*, Robert Graves discusses this too, and there quotes Demetrius. Graves also refers to an eight letter version of the sacred name. It may be that if one wants to count the base oracle centre (which in musical analogy is the octave expression of the top centre) one should have an eight letter version. This version of the name is:

JEHUOVAO

Note that E is the second letter.

We are faced with archaeological evidence that the second vowel, E, was prominently associated with the second oracle centre in descending order (See Plate 12 of this book). And we know from Herodotus that Dodona, the top oracle centre, was said to be founded by Egyptian priestesses from Thebes in Egypt. We also know that certain Egyptian priests sang the seven vowels (or eight vowels, including an aspirate) in succession. We have already seen

that the geodetic oracle centres seem to have an octave structure. And as this book went to press a discovery became known which demonstrated the existence of the heptatonic, diatonic musical scale in the ancient Near East. We may even make a presumption that the uttering of the seven vowels in succession may possibly have corresponded to the seven notes of the octave (but we may never know that for certain). And it is most important to emphasize that, however bizarre to us, the association of a vowel with an oracle centre is not our invention or surmise. The E may not only be read about in Plutarch but seen on ancient coins and on the omphalos stone itself (for both of which see Plate 14). And this association of the second vowel with Delphi has never been explained by anyone.

So granted all the above, what follows? If each oracle centre had a vowel

appendix IV

267

associated with it, then the second vowel being associated with the second centre would seem to imply a corresponding arrangement for the other centres. And if that is the case, it would seem that the entire system would be associated with and actually comprise a geodetic spelling-out, over eight degrees of latitude, of the unspeakable holy name of God, known commonly to the Hebrews as 'Jehovah'.

It is most important that anyone intrigued by this possibility should keep a wary eye for any further evidence. We should be on the lookout for representations of or associations of other vowels at the other centres. These may already be known to specialists in the field or there may be evidence of this sort languishing unclassified and unexplained in the basement of some museum. Or this sort of evidence may come to light at any time in the future. One place to begin looking would, it seems to me, be with an examination of the omphalos stone from Delos, which is to be seen in Plate 12 of this book. Does this omphalos stone have a single letter inscribed on it similarly to the Delphi omphalos stone? And what of all the other omphalos stones, such as the one from Thebes in Egypt (see Plate 12). Are any of these well enough preserved to show a puzzling single hieroglyph of a vowel? I have not carried out any investigation of this sort myself at the present time.

In closing, it would seem that the E at Delphi must fall into some coherent system of the kind I suggest, and the explanation of the enigma must be connected with Plutarch's lightly advocated second explanation—that to do with E being the second vowel. (Babbitt's exclusion of the diphthong on the basis of the ancient coins to be seen in Plate 14 of this book is therefore crucial, and to my view conclusive.)

Notes

1 The dialogue 'The E at Delphi' is to be found in English in Volume V of Plutarch's *Moralia* (altogether 15 vols) published in the Loeb Classical Library series, London. William

Heinemann Ltd , and U S A Harvard University Press The volume first appeared in 1936, and the translation is by Frank Cole Babbitt Other works of Plutarch in the same volume are 'Isis and Osiris', 'The Oracles at Delphi No Longer Given in Verse', and 'The Obsolescence of Oracles'

2 Ibid See Plate 14 of this book

## APPENDIX V

### Why the Hittites were at Hebron in Palestine

We read in Genesis 23:7 that 'Abraham stood up and then bowed low to the Hittites, the people of that country' The only trouble about this is that, according to our extremely sound archaeological knowledge, there should not have been any Hittites in 'that country' namely, at Hebron in Palestine The Hittite conquests never extended that far south So what do we do with this riddle?

In his book 'The Hittites', Professor Oliver Gurney has an entire section (pp 59-62) entitled 'The Hittites in Palestine' In it he says

We have now to deal with the paradoxical fact that, whereas the Hittites appear in the Old Testament as a Palestinian tribe, increasing knowledge of the history of the ancient people of Hatti has led us ever farther from Palestine, until their homeland has been discovered in the heart of the Anatolian plateau Moreover the preceding outline of Hittite history will have shown us that before the reign of Suppiluliumas there was no Hittite state south of the Taurus that the Syrian vassal states of the Hittite Empire were confined to the area north of Kadesh on the Orontes, and that although Hittite armies reached Damascus, they never entered Palestine itself Of the neo-Hittite states there was none south of Hamath, and the latter did not include any part of Palestine within its territories, being separated from it by the Aramean kingdom of Damascus

The presence of Hittites in Palestine before the Israelite conquest thus presents a curious problem So far from explaining it, all our accumulated knowledge of the people of Hatti [the Hittites] has only made it more perplexing

References in the Bible include Genesis 23 (entire), Genesis 26:9-11:34-5, 27:46 (where Rebecca says to Isaac: 'I am weary to death of Hittite women! If Jacob marries a Hittite woman like those who live here, my life will not be worth living!'), and 36:1-3 Further crucial reference to the Hittites appears in the Book of Numbers 13:29 There Moses is told by some men he had sent at the Lord's command to explore Hebron (and we are told in Numbers 13:22-3, that Hebron was built seven years before Zoan in Egypt which is a

curious remark, implying a connection between Hebron and Egypt and also that there was something special at Hebron which could be described as 'blessed'), that at Hebron they had seen the Hittites

We thus find clear evidence in books of the Bible for the Hittites residing in Palestine. And their settlements were specifically in the hills at Hebron

## APPENDIX V

269

Gurney says. Who, then, were these Hittites of the Palestine hills? A very ingenious answer has been put forward by E. Forrer. The gist of this is that, considerably before 1335 B.C., some Hittites from the city of Karustamma in the north-east of Anatolia had gone to Egypt, of which documentary evidence exists

However surprising it may seem, the text here quoted states explicitly that during the reign of Suppiluliumas some men from this obscure northern city entered the 'land of Egypt', a term which would include all territory under Egyptian rule. The text leaves the circumstances under which this occurred obscure, but the reference to the Weather-god of Hatti as the instigator of the move is in favour of a deliberate act of state rather than a flight of fugitives from the Hittite conquest, as suggested by Forrer. However that may be, we have here one certain instance of a group of Hittites (i.e., subjects of the King of Hatti) entering Egyptian territory, and the possibility of their having settled in the sparsely populated Palestinian hills is not to be ignored. (But) emigration of Anatolian Hittites to Palestine cannot have been a frequent occurrence. (and) there is some hope that further excavation [of texts] among the archives of Boghazkoy will bring enlightenment

It should be pointed out that the reign of Suppiluliumas during which the above emigration took place covered the years 1380-1346 B.C. It was to him that the widow of Tutankhamen, the Egyptian Queen Ankhesenamun, third daughter of Pharaoh Akhenaten, sent a plaintive letter asking for one of his sons to become her husband. He sent a son, but the son was ambushed on the way to Egypt and killed, probably by Hor-em-heb, who seized the throne of Egypt and forced Ankhesenamun to marry him in order to legitimize his usurpation. This is a sad story but does not really concern us here. I mention it merely to bring to life the chronology of the emigration to Hebron, and also because it demonstrates the close links possible at that time between the Hittites and Egypt. Those who wish to read the letter in full and follow up this interesting tale of personal tragedy are referred to Ancient Near Eastern Texts (ed. Pritchard, see Bibliography), pp. 319, 395

However, the Hittite emigration in the reign of Suppiluliumas cannot have been the original Hittite settlement at Hebron. For if Abraham met Hittites

when he arrived at Hebron, then there must have been Hittites there for several hundred years before the reign of Suppiluliumas which extended c. 1380-1346 B.C. We learn from George Roux in his book *Ancient Iraq* p. 242 'Abraham and his family came from Ur in Sumer to Hebron in Canaan, probably about c. 1850 B.C.', and there are good reasons for placing Joseph's migration to Egypt during the Hyksos period (1700-1580 B.C.) 'Despite the fact that there can be a case made for Abraham's Ur being a different Ur, the main point is the date, for Abraham went to Hebron and met Hittites already there five hundred years before the emigration which Gurney mentions. Roux repeats his dating and gives references, on page 215 of his book

It is likely that, half a millennium after Abraham, the Hittite emigration of which we have proof during the reign of Suppiluliumas went to Egyptian territory, and quite probably to Hebron, to reinforce the Hittite community

270

## THE SIRIUS MYSTERY

### APPENDIX V

271

which had already been there for many centuries, but which was facing hard times. One has only to read the Amarna Letters in translation in *Ancient Near Eastern Texts* - vivid, compulsive, desperate documents - to know the anarchy into which the region of Palestine was plunged during this period. The prince of the Hebron region, Shuwardata, first fought the rapacious Apiru raiders who swarmed over the countryside and then joined them, rebelling against the Pharaoh before whom, in his correspondence, he had shortly before been 'bowing seven times and again seven times, both prone and supine'. But Egypt was weak, and Palestine degenerated into chaos. It is no wonder that during this period there was a Hittite migration to what was titular Egyptian territory. No Hittite settlement at Hebron could have felt itself entirely secure. But what was the reason for the Hittite settlement at Hebron in the first place?

In the light of our earlier elucidation of the geodetic oracle octaves, it seems clear that the presence of the Hittites at Hebron can be explained on religious grounds. For we know that Hebron was the 'base oracle' centre of the eastern geodetic oracle octave. The top centre of this same octave was Metsamor at Ararat, to the north and east of Hittite territory, and is probably the reason why the Hittites who migrated to 'Egyptian territory' during the reign of Suppiluliumas were from an obscure north-eastern city (because this was the closest Hittite region to Ararat). The area of Ararat was later to become the kingdom of Urartu, and we know that this kingdom and the Hittites were not altogether strangers, for we learn from Gurney pages 44-5 'The North Syrian

Hittite states may have felt a certain racial or cultural affinity with Urartu.

Since we have documentary evidence that it was a divine command which made the Hittites of the fourteenth century B.C. go to what we assume was possibly Hebron, we can see that they were obeying an oracular injunction. This is natural if their activity was connected with the oracle centres. Indeed, they could not have gone without a divine command on such exclusively divine and non-imperial business. Gurney may be quite right in saying that the journey was a deliberate act and not a flight of fugitives. It was as deliberate as the 'doves who flew to Dodona'.

We have distinct evidence that Hebron really did have an oracle centre, apart from its being on the same latitude as Behdet. To investigate this, we turn to *The White Goddess* by Robert Graves, where in Chapter IX he discusses Hebron a great deal.

But Caleb conveyed the Holy Spirit to Hebron when, in the time of Joshua, he ousted the Anakim from the shrine of Machpelah. Machpelah, an oracular cave cut from the rock, was the sepulchre of Abraham, and Caleb went there to consult his shade. It is likely that neither Isaac nor Jacob nor their wives were at first associated with the cave. The story of its purchase from Ephron and the Hittites, is told in Genesis 23. Though late and much edited, this chapter seems to record a friendly arrangement between the devotees of the goddess Sarah, the Goddess of the tribe of Isaac and their allies the devotees of the Goddess Heth (Hathor? Tethys?) who owned the shrine. Sarah was forced out of Be'er-Lahai-Roi by another tribe and came to seek an asylum at nearby Hebron (p. 162).

Graves states (p. 164) that Abraham was in fact a tribe, and that this tribe also came down from Armenia (vicinity of Ararat). He says "Abraham" being in this sense the far-travelled tribe that came down into Palestine from Armenia at the close of the third millennium B.C. In fact, we must give some thought to 'the chosen people' later known as Hebrews being 'chosen' in the sense that they were particularly connected with tending an oracle centre or centres. Did Abraham go to Hebron for the same reasons that the Hittites did?

Graves says (p. 164)

J. N. Schofield in his *Historical Background to the Bible* notes that to this day the people of Hebron have not forgiven David for moving his capital to Jerusalem ('Holy Salem') which they refer to as 'The New Jerusalem' although Hebron were the authentic one. There is a record in the Talmud of a heretical sect of Jews, called Melchizedekians, who frequented Hebron to worship the body (consult the spirit?) of Adam which was buried in the cave of Machpelah.



In fact, these Melchizedekians, though considered heretics, may have been adherents of a purer undistorted form of worship. And it may be that David was the great perverter of Judaism by moving Holy Salem away from Hebron. Graves continues

For Adam, 'the red man', seems to have been the original oracular hero of Machpelah. It is likely that Caleb consulted his shade not Abraham's, unless Adam and Abraham are titles of the same hero. Elias Levita, the fifteenth-century Hebrew commentator, records the tradition that the teraphim which Rachel stole from her father Laban were mummified oracular heads and that the head of Adam was among them. If he was right, the Genesis narrative refers to a seizure of the oracular shrine of Hebron by Saul's Benjaminites from the Calebites.

Caleb was an Edomite clan which suggests the identification of Edom with Adam: they are the same word, meaning 'red'. But if Adam was really Edom, one would expect to find a tradition that the head of Esau, the ancestor of the Edomites, was also buried at Hebron: and this is, in fact, supplied by the Talmud: that Esau's body was carried off for burial on Mount Seir by his sons: and that his head was buried at Hebron by Joseph.

Elsewhere (page 167) Graves says

It is possible that though the Calebites interpreted 'Adam' as the Semitic word Edom ('red') the original hero at Hebron was the Danaan Adamos or Adamastos, 'the Unconquerable', or 'the Inexorable', a Homeric epithet of Hades, borrowed from the Death Goddess his mother.

Graves says that according to the tradition (p. 161) 'Hebron may be called the centre of the earth, from its position near the junction of two seas and the three ancient continents'. How similar this 'centre of the earth' epithet is to Delphi's, as 'the navel of the world'. All the main oracle centres were navel or omphalos centres of (the earth. Hebron's description as such is what one would

have predicted. The traditions of the creation of Adam at Hebron and of its being the site of the Garden of Eden, as Graves tells us in this chapter, make sense also when it is realized that Hebron was the base of the entire eastern geodetic octave of oracle centres. It was the eastern counterpart of Bendet itself.

Graves tells us at the beginning of Chapter Four of the later history of Hebron.

A confederacy of mercantile tribes, called in Egypt, the People of the Sea' invaded Syria and Canaan, among them the Philistines, who captured the shrine of Hebron in southern Judea from the Edomite clan of Caleb: but the Calebites ('Dog-men'), allies of the Israelite tribe of Judah, recovered it about the same time. These borrowings were later harmonized in the Pentateuch with a body of Semitic Indo-European and Asiatic myth which composed the religious traditions of the mixed Israelite confederacy.

In closing, we should note with a minimum of surprise, that the guardian tribe of the shrine of Hebron, the Calebites, were 'Dog-men'. Dogs are guardians, and preserve the secrets of the Dog Star Sirius, particularly as expressed in the ancient geodetic oracle octaves.

As for the Hittites, they were at Hebron and only at that specific place in Palestine because of its oracle centre. That is why they were 'sent by divine command', centuries later, presumably to reinforce that very place against the dangers of a turbulent time when Egyptian control under Akhenaten had collapsed.

## APPENDIX VI

### The Dogon Stages of Initiation

The following description of the Dogon system of graduated initiation into the mysteries of tribal religion is taken from *Le Renard Pale* (The Pale Fox) by Marcel Griaule and Germaine Dieterlen.

The Dogon, who have classified everything, have established a layered hierarchy of their teachings they give to the initiates. Their knowledge is staggered in four degrees, that are, in the order of their importance, the *giri so*, the *benne so*, the *bolo so*, and the *so dayi*.

The *giri so*, 'word at face value', is the first knowledge implying simple explanations where the mythical characters are often disguised, their adventures simplified and invented, and are not linked together. It has to do with invisible deeds, concerning the ordinary rituals and materials.

The *benne so*, 'word on the side', includes 'the words in the *giri so*' and a thorough study of certain parts of the rites and representations. Their coordination only appears within the great divisions of learning which are not completely revealed.

The *bolo so*, 'word from behind' completes the preceding learning on the one hand, and on the other hand furnishes the syntheses that apply to a vaster whole. However, this stage does not yet include instruction in the truly secret parts of the tradition.

The *so dayi*, 'clear word', concerns the edifice of knowledge in its ordered

complexity

But initiation is not merely an accumulation of learning, nor even a philosophy, nor a way of thinking. It has an educational character: for it forms the individual, moulds him, as he assimilates the knowledge it imparts. It is more than that, because of its vital character; as it makes him understand the structure and system of the universe, it brings the initiate progressively towards a way of life which is as aware and complete as possible within his society, in the world, as he was conceived and created by God.

Thus, a fourth dimension is introduced into the life of the Dogon, peculiar to the myth and symbol, which is as necessary to their existence as food and drink, in which they move with ease and flexibility, but also with the deep sense of the immanent presence of the invisible thing they are invoking. At a given moment, for such and such a ceremony, they know to what sequence of the myth and to which connections (their) act belongs.

# THE SPHINX MYSTERY

*The*  
**Forgotten Origins**  
*of the*  
**Sanctuary of Anubis**



ROBERT TEMPLE with OLIVIA TEMPLE

# THE SPHINX MYSTERY

*The*  
Forgotten Origins  
*of the*  
Sanctuary of Anubis

Robert Temple  
with Olivia Temple



Inner Traditions  
Rochester, Vermont



***To our friends Mohamed Nazmy of Cairo and Stefano Greco, pianist  
and musicologist***

# The Sphinx Mystery

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*NEANDERTHALS AND THE OUTSIDER*

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## About the Illustrations

All the illustrations in this book are presented as duotones to capture the flavor of the Egyptian landscape and to preserve the original reproduction quality of many of the historic photographs. We have framed these rare historic images in black to clearly separate them visually from the more modern photographs and the diagrams that comprise this book.

All the photographs originally taken in color may be seen in full color on the book's website, [www.sphinxmystery.info](http://www.sphinxmystery.info), where other supplementary material and information is also available. The website is intended for use as a complement to the book, and though it does not accept e-mails or host discussion, we hope readers will find it a valuable, and graphically rich, information resource.

# CONTENTS

[Cover Image](#)

[Title Page](#)

[Dedication](#)

[Epigraph](#)

[Acknowledgments](#)

[About the Illustrations](#)

[Introduction by Olivia Temple](#)

[Introduction by Robert Temple](#)

[A Note on the Use of Egyptian Words in This Book](#)

**Chapter 1.** [Sphinx Obsession](#)

**Chapter 2.** [The “Secret Chamber” Beneath the Sphinx](#)

**Chapter 3.** [An Amazing Survival](#)

**Chapter 4.** [The Face of the Sphinx](#)

**Chapter 5.** [The Sphinx as Anubis](#)

**Chapter 6.** [Sphinx Island](#)

**Chapter 7.** [The Sphinx and the Giza Plan](#)

**Chapter 8.** [The Golden Angle of Resurrection](#)

[Accounts of the Sphinx from Roman times to 1837](#)

[Section 1](#)

**Accounts of the Sphinx from Roman Times to 1798**

[Section 2](#)

## **Accounts of the Sphinx from 1800 to 1837**

### [Appendix One](#)

#### **Excavations of Monsieur Mariette at the Great Sphinx**

**BY AUGUSTE MARIETTE**

**TRANSLATED BY OLIVA TEMPLE**

### [Appendix Two](#)

#### **Concerning the Age of the Sphinx at Giza**

**BY LUDWIG BORCHARDT**

**TRANSLATED BY ROBERT TEMPLE AND ELEONORE REED**

### [Appendix Three](#)

#### **Sphinx**

**BY JAMES BURTON (1822)**

### [Appendix Four](#)

#### **A Description of Giambattista Caviglia's Excavation of the Sphinx**

**TRANSLATED BY STEFANO GRECO**

### [Appendix Five](#)

#### **Scientific Visual Documentation of the Sphinx**

### [Footnotes](#)

### [Endnotes](#)

### [About the Author](#)

### [About Inner Traditions • Bear & Company](#)

### [Also by Robert Temple](#)

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# INTRODUCTION

OLIVIA TEMPLE

*O Behold, I pass near you,  
I have placed Anubis as your guardian,  
I give you light.*

THE VOICE OF THE SUN IN THE  
ANCIENT EGYPTIAN TEXT  
*THE BOOK OF CAVERNS*

I am not alone in dividing my life into two, an equivalent to BC and AD, which in my case is Before Egypt and After Egypt. Most people who spend time among the ancient places there find it becomes harder subsequently to visualize how life was *before* . . .

Since my first trip to Egypt many years ago, the meaning of life has become clearer. Questions and doubts, fears and shadows, have become mysteriously clarified as if I have suddenly found the key to a complicated coded message.

The most striking thing among the many that the ancient Egyptian world has revealed to me is that *there was no word in their language for religion*. It is only when you think about this for some time and have those words as a mantra in your subconscious as you explore the temples and tombs in Egypt that the enormity of this fact takes shape. Your own thought processes, the very foundations of your own culture and spirituality, are not so much questioned as reprogrammed. This brings to mind John Lennon's song *Imagine*: "Imagine there's no heaven . . . and no religion too . . ." All the things we imagined are suddenly not quite what they seem. One must always be aware of the fact that it was the afterlife that was the important part of life to the ancient Egyptians. Life itself was a big buildup and preparation for the ethereal journey to the otherworld. The ultimate goal was to become an *akh*, or immortal glorified spirit. One's mortal life was only to prepare for this end. So in some ways it simulates the Christian faith: we live on Earth as good citizens, acknowledging the divine and hoping after death to go to heaven.

In Egypt, it feels right to hail the symbolic power of the individual animal-headed gods who are so mysteriously carved onto the walls and crypts and painted on the ceilings and in the temples—a pagan worship, a giving thanks, and an awe of the skyward journey that brings the stars and sunbeams down to Earth. Not one almighty and vengeful God but many minor deities, each one vital in contributing to the whole, the Cosmic Order.

So, when we spent time, lots of time, on the Giza Plateau, wandering around for hours above- and belowground, in the Valley and Sphinx Temples, the Osiris Shaft, the Great Pyramid at night, and the

Sphinx precincts, examining almost every stone and every inch, a new ray of recognition pierced our souls. Everyone who knows this place, who spends more than a casual amount of time in the sacred places of the ancient Egyptians, experiences a defining moment, an alchemical change, that creeps into your psyche like a drug.

Everyone has seen pictures of the Sphinx and the pyramids since childhood; they are stamped indelibly onto our memory bank. So, it was a big shock meeting the Sphinx face-to-face, walking the length of its scaffolding-clad body, seeing how deep down it sits in the sand, as if in a pit, and how it seems to smile graciously, offering up its secret if anyone will listen . . . Shhhh! . . . I am Anubis, can't you see? Oh! I see! The Sphinx is Anubis! Can't you see? That Mona Lisa smile, the elongated and huge body, the long front legs ready to spring into action when the starter gun pops, the strata stripes and weather-worn sides of the pit in which it sits, the solid hulk, marooned in the sand like a beached whale. There is a sense of water here, you can almost hear it; yes, the Sphinx has known a watery past.

Later, back in England, immersed in the early travelers' tales, when Cairo across the river was two hours from the pyramids along a palm-fringed lane, the water surrounding the Sphinx, the sense of it being an island with Anubis the Guardian, became more and more apparent.

For nearly two millennia, only the neck and head of the Sphinx were visible above the sand, with a vague spinal shape trailing behind it. There was no leonine creature, no Sphinx Temple, Valley Temple, or Chephren Causeway. Although Pliny describes the Sphinx in the first century AD, when it had been excavated and cleared of sand, as a burial place for a king, and the legend of a secret chamber was born, the desert sands did not take long to cover the colossus again. By the time of Napoleon's expedition in 1798, it was, once again, only the head and neck that showed above the ground. Time after time, excavators had unearthed the Sphinx, and time and again the sands drew a veil over it. When you walk or drive out into the deserts of Egypt it is quite a shock to discover how hilly and undulating, how ever-changing it is, shifting and stirring endlessly like a restless windblown ocean. Upon this furrowed surface you can find small pieces of petrified wood and occasionally a bit of iron from outer space. I saw a vivid mirage there on one of those long hot walks, a shimmering lake, complete with palm trees—illusion is never far from reality, and perhaps beyond was the Egyptian Eternity.

Before the hieroglyphs, before the mystifying and tantalizingly beautiful decorations of the temples etched with perfect exactitude and colored with rich pigments, before the high decoration of the Fifth Dynasty with its Pyramid Texts written on walls, the Sphinx was there, guardian, god, long before Jesus walked the earth. Our attempt at uncovering the mysteries of the Sphinx is perhaps only the beginning, and it will be for others who come after us to follow the trail and find more signs. But it is as if the Sphinx itself coauthors our offering, for he too wants his past to be revealed. He is our third collaborator, and no matter how many modern slabs of limestone cover him up and hide his origins, the Sphinx "Anubis" will continue to be the *ba*, or spiritual force that forever guards the pyramids

*From now on, O living matter, you are no more  
Than a lump of granite surrounded by a veil of terror,  
Dozing beneath the hazy Saharan sands  
An ancient Sphinx unknown to the heedless world,  
Unmarked on the map, whose timid smile lights up  
Only when the sun goes down.*

CHARLES BAUDELAIRE,  
"SPLEEN II" FROM *LES FLEURS DU MAI*

*In the evening she leads him to the graves of the elders  
in the tradition of Lamenting, to the sibyls and the prophets.  
But night comes on, so they go along more slowly, and soon  
rising upwards and moonlit, stands he who watches over  
all the funerary monuments Brother to that of the Nile,  
the sublime Sphinx—: for the sealed chamber, a  
Countenance.  
And they shudder at the kingly bedecked head, which for all time,  
in silence, lays the human visage  
upon the scale balance of the stars.*

RAINER MARIA RILKE, *TENTH DUINO ELEGY* (71-80)

TRANSLATED BY ROBERT TEMPLE

# INTRODUCTION

ROBERT TEMPLE

The most important conclusion to be drawn from the strange odyssey of this book is that the Sphinx is not what we think it is. When Olivia and I first stood and looked at the Sphinx we both felt there was something wrong with it. Why was the head so ludicrously tiny? Why was the back flat? We thought it was supposed to be a lion, but that was no lion. And what was it doing down in that pit? Nothing seemed right, and it made us uncomfortable.

One of the things that most disturbs me is the phenomenon known as “consensus reality.” That is what we all agree to believe. Often it is incorrect, but we go on believing it anyway, because we are too lazy to alter our views. Most people like to follow the line of least resistance in life, which means not having to bother to think too much. Thinking is wearisome, takes time and energy, and we have too little of both. So why not let somebody else do this painful task for us? Hence the popularity of “secondhand thinking,” whereby we plug our brains into some remote service provider, like connecting our computers to the Internet, and allow other people’s ideas to flood in and become our own. So easy! So convenient! Fast, clean, and efficient! Who needs to think of an idea when you can get an idea anytime from somewhere else and just click on “accept all changes” and it’s done?

But I never accept anything unconditionally. I have to verify everything. If people say the light is switched off, I check anyway. If they say the sky is blue, I check. It might be gray, who knows? One reason why I do not believe that anyone is ever correct is that I do not believe it is possible to be correct. I certainly don’t hold any of my opinions with certainty. I look upon *certainty* as a condition of the human species and precisely what is wrong with us. Everybody is certain, they are certain about this, certain about that. But they are all wrong. I refuse to be certain about anything. That is why I challenge conventional notions. I object to both the word *conventional* and the word *notion*.

So that is why I did not accept the Sphinx when I first saw it.

Having rejected the accepted consensus view of the Sphinx at first sight, we then had the problem of deciding what to do about it. If it wasn’t what everybody knows, then what was it?

That’s what this book is all about.

The first thing that seemed certain was that the Sphinx, whatever it was, was not a lion with a man’s head. The second thing that seemed certain was that the head was not original, because it was out of proportion. Several people, I later discovered, had mentioned this over the years, and suggestions that the head had been recarved were not new, although they were still a minority opinion. The disproportionate size of the body to the head could not be seen prior to the excavation of the Sphinx in 1926, so that is why there were no earlier suggestions of the recarving of the head.

Those were good things to start with.



Then there was the question, which had nothing to do with what we were seeing, of whether there was a secret chamber under the Sphinx. This was a subject of feverish interest already, discussed in many popular books and articles and contemptuously rejected in various scholarly books and articles. From previous experience, I suspected that probably neither argument was right. In most cases where people argue violently with one another, they are all wrong.

And then yet again, there was the subject of "ancient rain." It was supposed to have rained at the Sphinx 12,500 years ago, various enthusiastic popular authors (all of whom I knew personally) insisted. That was where all the strange signs of what looked like water erosion came from. However, I knew enough about archaeology to know this wasn't possible, because it meant that seven thousand years or more of archaeological remains were missing. You can't just not have anything in the ground, because there is always something in the ground. So it had to be wrong. But clearly there was water erosion, and it is easy to see. So what was the answer to that, then?

There were plenty of enigmas to try and solve!

I have to admit that it has all been great fun. It has been a lot of hard work, but then nothing is fun if it is too easy. Sometimes I tell people I have been inside the Sphinx, and they think I am joking. Sometimes I tell them the Sphinx is not a lion with a man's head at all, and they think I am joking. Sometimes I tell them that the Sphinx once was a giant statue of Anubis, crouching as a guardian of the sacred necropolis at its entrance. They look surprised for a moment, and then they readily agree with me. Most people think it is obvious "once you think about it." And so our job was to think about it, so that everybody can see just how obvious it is. Take a look at figure 5.11, and you will see what I mean.

This book has benefited from our special access to the Sphinx and the Valley Temples in front of the Sphinx, which was made possible because we were given permission by the Egyptian Supreme Council of Antiquities, along with a colleague from Greece, to do intensive studies of those two structures in connection with a dating project. As a result, I was able to make some fundamental observations relating to the Sphinx that would otherwise have been impossible. One study was the result of an idea I had while we were standing for hours on the floor of the Sphinx Temple (which is normally closed to all visitors). In a moment between other activities, I took a sighting with an inclinometer we happened to have with us, and the result was most astonishing; I describe it later on.

But the most important thing that resulted from that special access was something that I did not appreciate at the time at all. Because, as I described earlier, I always like to check everything personally, and I am so thorough about detail that everyone who is with me is exasperated by it, I meticulously took a very large number of photos of the passage between the two temples and especially of the base of the north wall of the Valley Temple. My attitude was "you never know when something is going to be useful one day." So I took a long series of photos of what most people would think was just a boring stone wall of no interest whatsoever. I had no idea at the time of the importance of the results. The wall was so uninteresting and unremarkable, in fact, that neither of the two excavators of the Sphinx Temple (Hassan and Ricke) nor the excavator of the Valley Temple (Hölscher) bothered to mention anything about it in their publications. In fact, there is no evidence they ever even bothered to look at it except in passing.

It later turned out that this series of photos of a stone wall, which no one else had ever looked at twice, was crucial evidence to support an astonishing conclusion about the Sphinx. These photos are all reproduced here, because as all the features shown in them have now been covered over with modern restoration stones and cement, they are the only surviving evidence.

Before a person can understand anything, he or she should study everything anybody else has ever said about it first. So we set about systematically collecting every account of the Sphinx since the first known

one, by the Roman author Pliny in the first century AD. By the time we got to the year 1837 we were overcome by exhaustion and had to stop, as they were beginning to drown us. Most of the accounts were not in English, so those all had to be translated. Olivia translated all the French ones, I translated the German ones, and friends Robert and Reiki Rubinstein did the Dutch one. We did not collect every Arabic account, but we translated into English those Arabic accounts that had already been translated into French.

As a result of studying the early accounts of the Sphinx, I made the surprising discovery reported in chapter 3 of the survival of specific information through folklore for three thousand years, or seventy-five human generations! This in itself is a major insight into how information can survive without total degradation and loss of message across a length of time bordering on the inconceivable. If I had discovered nothing else, I would be proud of having brought that to light.

We are left now with a totally different Sphinx than the one with which we started. We started with a lion and we got a dog; we started with the face of either Cheops or Chephren and we got another pharaoh's face altogether, whom I have been able to identify precisely. We started with a dry Sphinx and we got a wet one. We started with a Sphinx that was not mentioned at all in the most ancient texts, the Pyramid Texts, and we ended with a Sphinx that was mentioned a great deal in the Pyramid Texts in the most specific way, even saying that it stood beside a causeway at Giza. We started with a Sphinx with nothing inside and we got an interior tunnel. We started with a Sphinx with no secret chamber and we got 281 years' worth of published eyewitness reports of the secret chamber beneath the Sphinx by people who even gave us its measurements and its precise location beneath the statue.

We have a new Sphinx now. Long live the Sphinx!

## A Note on the Use of Egyptian Words in this Book

The linguistic symbols used by Egyptologists to transliterate Egyptian words and names have not been used anywhere in this book, *including in quotations*, where we have spelled out whole words in common English spellings to facilitate the reading of these words and names. We hope that the quoted authors concerned will understand that we are trying to make their comments available to a wider public readership.

When Egyptological authors publish their works, they generally use hieroglyphs and other linguistic symbols or complex transliterations. The following passage that I have been translating from a text originally published in German by Erik Hornung is an example of Egyptian transliteration that uses recognizable letters but is nonetheless no more comprehensible for that.

“. . . the *jpwt nt wnt nt Dhutj* . . . are from any point of view a mystery . . . King Cheops demands that Djedi fetches the *jpwt* for him, and moreover they are—an unknown number—inside a box of stone. Throughout, however, *jdt* seems to signify a box or chest . . . the mysterious box is described inside the secret chamber, so as in the Papyrus Westcar as a *fdt* in an ‘*t*’; but this box does not contain a *jpwt* . . .”

The situation gets even worse when linguistic symbols other than normal letters (such as *hryw šsr.w=sn<sup>n</sup> sm=sn hftj w R<sup>c</sup> m-ht is ‘p=f hr=sn*) are mixed in, as they always are. The use of these linguistic symbols or strings of consonants without vowels is intended to let professional readers know that the author is adhering to strict accuracy in transliteration. However, we have the responsibility of communicating with the general public, and having made this advance disclaimer, we hope that no misunderstandings will arise, or that any Egyptologist will in any way be blamed for our decision.

We have not bothered indicating these changes with brackets in order to avoid cluttering the content of the excerpted material. Anyone interested in seeing the original quoted excerpts will find source references in the notes or at the beginnings of the excerpts in part 2 and the appendices.

## SPHINX OBSESSION

The Sphinx and the pyramids are the central attractions in Egypt. All tourists who visit Egypt go to Giza to see them (see figure 1.1). And we know they have always done so, for Greek and Roman graffiti have been found there in profusion. After Egypt opened up for the first time to foreigners in the sixth century BC, the Greeks poured in and arrived in such numbers that the Egyptian kings had to try to restrict them to special cities of their own on the Mediterranean coast. This was only partially successful. Eventually the Greeks ended up ruling Egypt under the Greek dynasty known as the Ptolemies. After the death of Cleopatra, who was the last Ptolemaic queen, rule of Egypt passed to Rome. And Roman tourists then arrived over many centuries in countless thousands.

The Sphinx is not mentioned by the Greeks in any surviving writing, presumably because it was covered in sand up to the neck, and the head alone could not readily be seen from the vicinity of the pyramids. The first mention of the Sphinx in any classical text is by the Roman author Pliny, in the first century AD, by which time the entire Sphinx had been excavated and was free of sand. And in that first surviving mention from classical literature, Pliny prominently insists that a king was buried “in the Sphinx.” From that time, the beliefs that there was a chamber beneath the Sphinx and that a royal personage was buried there in such a chamber have grown into perennial obsessions.

But this has now, in our own time, turned into something more than just curiosity. Millions of people around the world today have become fixated on the Sphinx as an object that is at the center of conspiratorial acts of concealment, both ancient and modern. The interest is not really so much in the Sphinx itself. The question on people’s minds is: Is there a chamber beneath the Sphinx? Or, better still, is there a *secret* chamber?

Many books have now been devoted to this subject, which apparently have their origins in the clairvoyant perceptions of an American psychic named Edgar Cayce several decades ago. But despite all the talk, there has so far been a lack of ultimate or conclusive evidence that there is a chamber under the Sphinx, secret or not. Some soundings by high-technology gear have, as we shall see, suggested that there were cavities—many people prefer to call them chambers—in the rock beneath the Sphinx. The situation is complicated by the fact that the Giza Plateau is made of limestone and contains countless natural subterranean cavities in the rock.

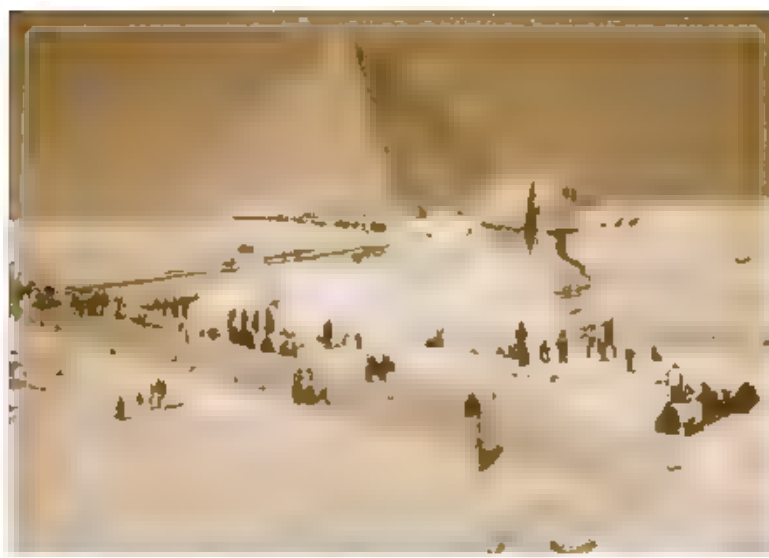


Figure 1.1 A view of the Sphinx that is never seen. I believe it has never been photographed from this precise angle. The Great Pyramid is in the background, and the white object at the base of its south face is the museum containing the ancient boat that was found buried in a pit at the foot of the pyramid. I took this photo leaning dangerously far over the southwestern corner of the roof of the Valley Temple, where no one is allowed to go today. (I had special permission from the Egyptian Supreme Council of Antiquities to do some work there.) On the other side of the fence in the foreground is the beginning of the Chephren Causeway, which extends up the hill to the Pyramid of Chephren, which is to the far left of the photo. (Photo by Robert Temple)

In one “shallow seismic refraction” study, published in *The First International Symposium on the Great Sphinx, Book of Proceedings* in 1992, the conclusions about the “underground structure” surrounding the Sphinx are amazingly bland and essentially amount to this: “The underground Structure below the Sphinx area is composed of different layers of Limestone. . . . From all seismograms recorded, there is no indication of faulting.”<sup>1</sup>

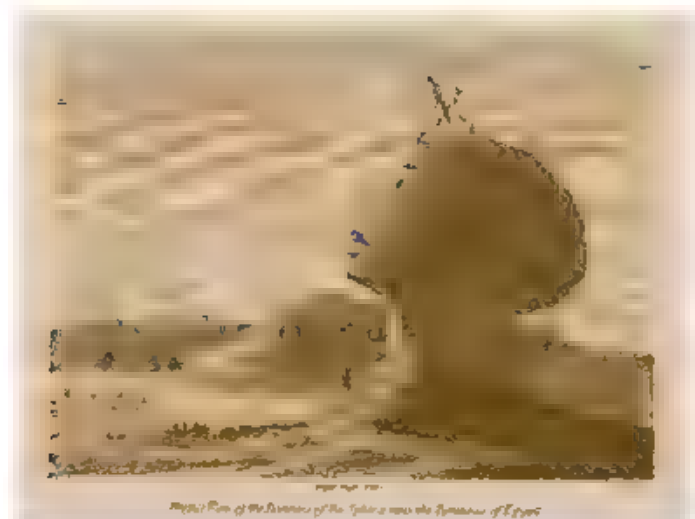


Figure 1.2. This amusing view of the Sphinx's head sticking out of the sand was published by Dominique-Vivant Denon in his book of travels in Egypt published in 1810. It represents the Sphinx as it was in 1798 and 1799, at the time of the arrival of the Napoleonic expedition to Egypt, with which Denon traveled. The men seem to be measuring the height of the head above the ground. (Collection of Robert Temple)

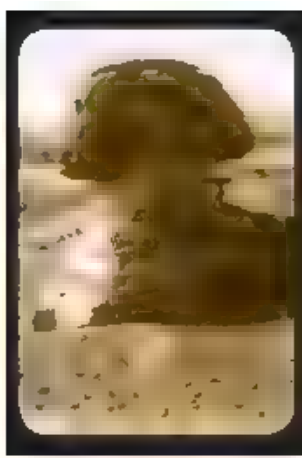


Figure 1.3. The head of the Sphinx circa 1910, almost submerged again. (*Collection of Robert Temple*)



Figure 1.4. This evocative lithograph of the Sphinx dates from 1839 and was drawn by David Roberts, famous for his many artistic views of Egypt at that time. This view shows how the sand has once more engulfed the Sphinx after the excavations of Caviglia. (*Collection of Robert Temple*)



Figure 1.5. An old glass slide of unknown date, showing the Sphinx covered up to the shoulders in a sea of sand. Note the ragged edge of the left lappet of the Sphinx's headdress, which today is smoothed out with modern cement. (*Collection of Robert Temple*)



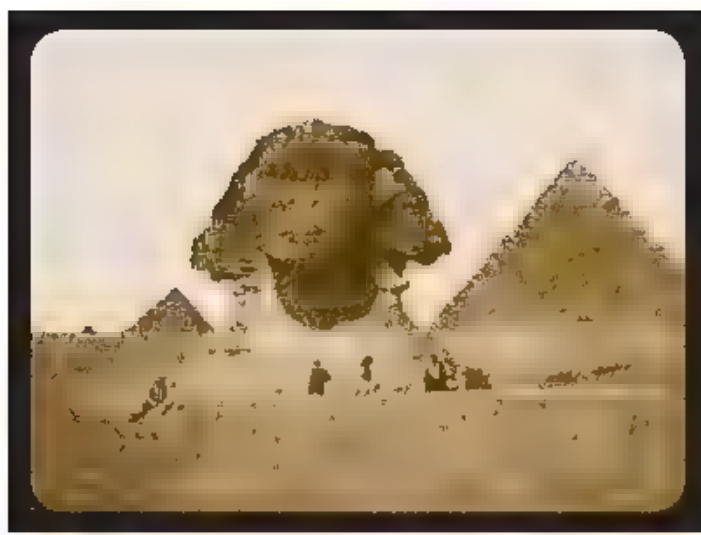


Figure 1.6. This photo is dated 1869. All we have is a sea of sand around the Sphinx, and of course the inevitable locals with nothing much to do that day. (*Collection of Robert Temple*)

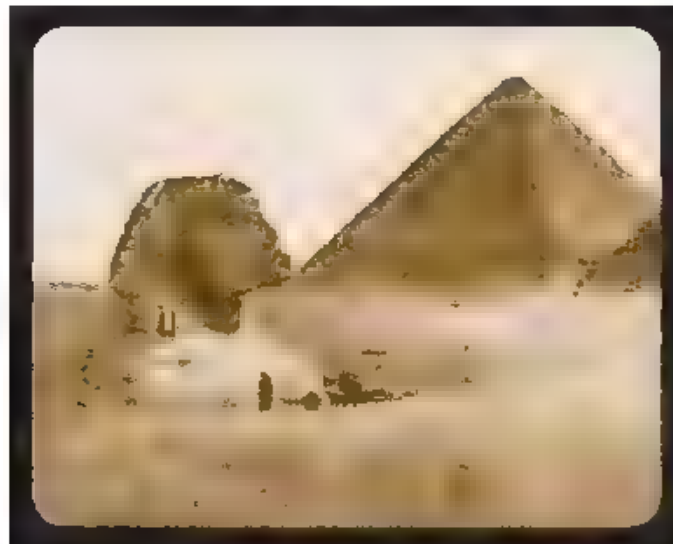


Figure 1.7. This old photo is also dated 1869. We can see how both the Valley Temple and the Sphinx Temple were at this time so entirely buried under vast sand dunes (in the foreground) that there was no hint of their existence. (*Collection of Robert Temple*)

This is not very exciting.

In an earlier book, *Applications of Modern Sensing Techniques to Egyptology* (1977), we learn that the use of a magnetometer at the Sphinx, which was briefly used “in about an hour of working time,” didn’t find anything of interest. The authors conclude: “If anything interesting beneath the Sphinx exists, it is likely to be a shaft or cavity, probably now filled, which would have a very small magnetic anomaly. In fact, cavities or voids cannot normally be detected by a magnetometer if the cavity is much deeper than its own diameter.”<sup>2</sup>

This is also pretty disappointing. However, a resistivity study (a study of the resistance to the flow of electricity through a material, and how this varies from place to place) at the Sphinx came up with some much more exciting findings, which the report describes as follows:

Several anomalies were observed as a result of our resistivity survey at the Sphinx. . . . A very limited number of measurements were taken due to the time scheduling of the project. As a result of the survey, the team discovered five areas of interest.

Behind the rear paws (northwest end) we ran two traverses. . . . Both traverses indicate an anomaly that could possibly be due to a tunnel aligned northwest to southeast.

Another anomaly exists in the middle of the south side near a square cupola added apparently in Roman times. This anomaly was verified by two overlapping traverses. . . . When the electrodes were moved 2m away from the previous traverse, the anomaly decreased in value. This is typical of the behaviour expected from a vertical shaft. . . . There are two anomalies in front of the front paws of the Sphinx. The bedrock in front of the Sphinx is covered with Roman-era paving stones and poor electrical contact between the paving stones and bedrock gave somewhat noisy resistivity traverses. However, one anomaly occurs on large electrode spacings, suggesting a cavity or shaft as much as 10m deep. The cavity, if present, is probably filled with rubble. . . . We feel that a more detailed survey should be conducted.<sup>3</sup>

This report is not widely available, and copies are hard to find. I have been fortunate to obtain one. It is doubtless the lack of clarity and reporting of information on these matters that has encouraged a vast number of members of the reading public to become convinced that there is at present a vast and sinister conspiracy to cover up secret knowledge of underground chambers at the Sphinx.

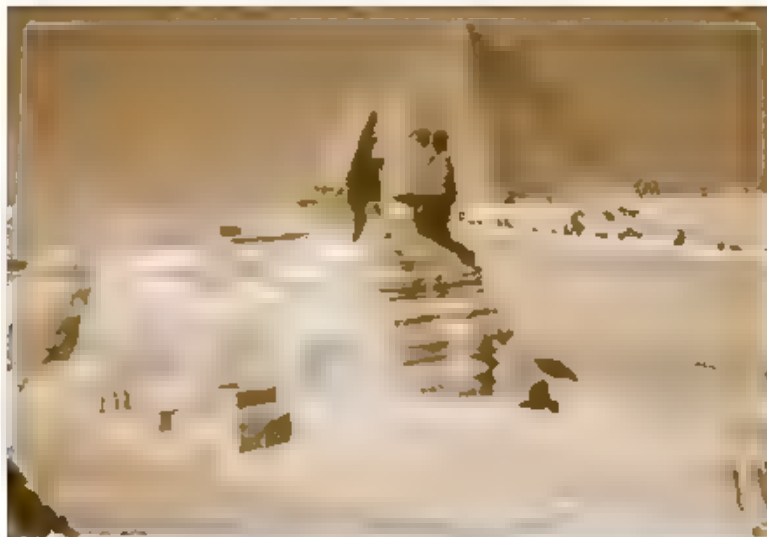


Figure 1.8. A view of the Sphinx from the roof of the Valley Temple. Just behind the Sphinx's right shoulder are the two strange "boxes," the large one in front and the smaller not far behind it, that protrude from the Sphinx's body and are unexplained, and are certainly later in date than the Sphinx itself. Although the smaller one could easily have been a statue base, the larger one rises so high that any statue of comparable proportions would have acted as a serious distraction to the Sphinx itself, and besides, we have no fragments from excavations of such a gigantic statue. In this photo, the light allows us to see the strikingly different color of the recarved head from that of the main body. (Photo by Robert Temple)

But the problem is more a failure of communication, general vagueness, and lack of enthusiasm among the "conspirators." They are probably covering up little more than that they are themselves lacking any conclusive evidence and are unsure what to think.

This lack of conclusive evidence is surprising, so I am delighted to be able to produce some at last. Now, for the first time, I reveal some *real* reports of a Sphinx chamber from early travelers. There are clear eyewitness accounts from as early as 1678 that we will consider later, but my first knowledge of this evidence comes from an old book of a slightly later date, and we will start with that. This first report that I encountered is rather vague, but it set me off on a very long and onerous search through all the early travelers' reports on the Sphinx to find more evidence, in which I was to be more successful than I had dared imagine.



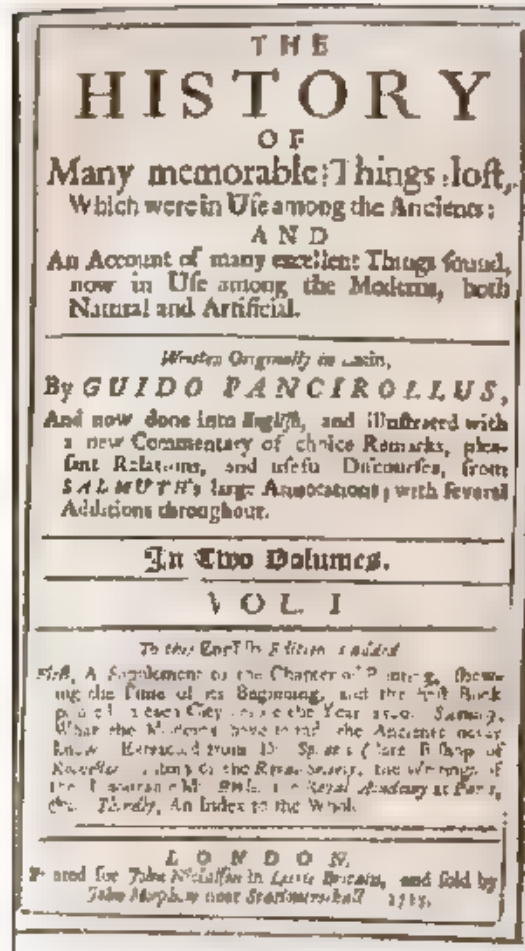


Figure 1.9 The title page of Guido Pancirolli's book *The History of Many Memorable Things Lost*, in its English translation (my own copy), London, 1715.

Let us follow the process of discovery. When I first encountered this information, it appeared to be the only such account of a Sphinx chamber in existence. It was published in 1715, and for nearly three centuries no one had paid the slightest attention to it.

But eventually, everything somehow seems to come to light, and I came across this initial report while researching ancient optical technology for my book *The Crystal Sun*. At that time I looked at the report of the Sphinx only out of mild curiosity. In fact, I photocopied it and did not actually read that section of the photocopy for months, for my attention was elsewhere. The title page of the book, and the page about the Sphinx, are reproduced in figures 1.9 and 1.10.

But before we get into this account published in 1715 and begin to evaluate it, let me tell you about my own experience of entering a chamber beneath the Sphinx. This chamber is known by repute to everyone with a deep interest in the Sphinx; it is the bottom of the little tunnel beneath the Sphinx's rump. You can see the relatively tiny size of the tunnel in figures 1.11 to 1.13, and me crawling out of it in figure 1.14.

## The COMMENTARY.

(a) [Sphinx]

*Pliny* makes mention of this *Sphinx*, in the 13th Chap. of his 35th Book. *Pteris* had one of *Carthago* built, and therefore when he told *Cæsar* that he did not understand his *Riddle*, he made answer and said 'Tenough, is apprehend it, for you have a *Sphinx* at Home.' When it came first to *Thebes*, it proposed Riddles to Passengers, and destroyed all those that could not untie them.

It had an Head and Face like a Girl, Wings like a Bird, the Body of a Lion, the Paws of a Lion, and the Tail of a Dragon. 'Twas an Hieroglyphical of a *Whore*, who under a human Head, makes a Crew of *Strangers*, but in her *Lion-like* Body, discovers her *Fierceness* and *Cruelty* to her *Paramour*.

(aa) [They say that King Amasis was interred in it]

So faith *Pliny*, I imagine the *Sphinx* to be a Sepulchre, but we cannot understand how it belong'd to *Amasis*, for all the Records and Traditions of this *Sphinx* are lost. That it is a Tomb, may appear, 1. By its Situation, which is in a Place, which was in former Ages a Buriall-place, and near the Pyramids and many other Caves. 2. It is to be imagin'd that it was a Sepulchre from its building. In the *Pyramid* is a Cave under ground, of a Dignity inferiour to that of the Head into which the curious have look'd, by an Entrance that leads into it; so that it could serve to no other Purpose but to keep a dead Corps in, as Travellers inform us.

(b)

Figure 1.10. The page in Pancirolo's book that mentions the chamber beneath the Sphinx, which was the first published account of it I came across although it was not the earliest, as I was to discover

The rump tunnel, if that is not too rude a designation, has been entered by only a tiny handful of people. It is not at all easy to photograph the rump tunnel, because it is very narrow and cramped and there are not many features; and to demonstrate the scale, presumably someone should stand in the photo at the bottom of the tunnel, after first removing the accumulated rubbish. I have been unable to get the necessary lights or organize such a photo, and I am unaware of anyone else ever having done so. But some impression of the interior of the tunnel may be obtained from my flash photo in figure 1.15.



Figure 1.11 This tiny hole at the base of the rear end of the Sphinx of Giza shows the entrance to a passage that descends 20 feet. (Photo by Robert Temple)



Figure 1.12. A close-up photo of the entrance to the rump tunnel. All the flat limestone blocks are modern reconstruction stones, not part of the original Sphinx. The way the bedrock has been cut away in a circular shape may here be seen clearly. The top of an interior modern steel support may also be seen. Behind the reconstruction blocks, a bit of the original Sphinx stone may be glimpsed above the hole. The rough workmanship and clumsy hacking evident here demonstrate that this is an intruded shaft from a late period that never formed part of the original intention of the Sphinx. It takes a thin person to squeeze inside. *(Photo by Robert Temple)*



Figure 1.13. It's amazing how much there is to see when you look down below the Sphinx's bottom. *(Photo by Olivia Temple)*



Figure 1.14 Here I am emerging from the "rump tunnel" beneath the Sphinx or, to put it more bluntly, with my head sticking out of the Sphinx's ass. The original stone can be seen behind me underneath the layer of smooth modern restoration blocks. (Photo by Olivia Temple)



Figure 1.15 This is a photo looking directly downward inside the entrance of the little hole in the Sphinx's bottom. This shaft and pit have been excavated out of the bedrock. As may be seen, it is all littered with tourist rubbish. But the pieces of paper lying on the bottom help one get an accurate scale. The pit is about 15 feet down, has no sign of water, and would comfortably allow a single person to "incubate" overnight in search of a sacred dream. It is too small for a tomb. Because the shaft is so crudely cut out of the rock, showing no regularity or professionalism, it must be a late intruded shaft. It probably dates from the Ptolemaic Period and was used under the Greeks and Romans, at a high price to selected persons, for healing and inspiration purposes. Since it could be used only 365 times a year, by one person at a time, the number of clients was necessarily small. Alternatively, the hole may have been used for someone to sleep overnight to prepare him or her to deliver oracular prophecies through a speaking tube at dawn, when the crowds came to pray to the Sphinx. This shaft continues upward and curves around the southern side of the Sphinx. (Photo by Robert Temple)

Squeezing into the tiny opening at the base of the Sphinx's rump is a difficult business (see figure 1.13). As soon as you stick your head in, you can see that a metal ladder has been affixed inside, onto which you can cling, so that you can hoist yourself around and have something to hold on to. Then you can clamber into an upright position. Once you are standing, and not perilously poised over a hole, you can take the time to look around you. Naturally, you have to have a light in your hand or you cannot see a thing.

What you can see from the ladder is that a narrow tunnel about 15 feet deep has been dug out of the rock. At the bottom, the first thing you notice is a lot of rubbish that has blown in through the hole, as the



Giza Plateau is covered with masses of rubbish dropped every day by tourists and visitors. As you peer intently to see just what is at the bottom, it becomes clear that the rock has been scooped to form a rounded hollow that is big enough for two people to stand in side by side.

What struck me about this hollow was that a lot of trouble seemed to have been taken to create it, and it did not resemble the effort of a treasure seeker. I had the impression that its real purpose was to enable a person to curl up in a bed and lie there comfortably overnight, or at least for some hours. My reaction to seeing this "cell," for that is what it reminded me of, was to assume that this is where special acts of incubation may have taken place. *Incubation* is the word used to describe the ancient practice, common among the Greeks, of sleeping in a temple overnight in order to have a sacred dream. The Greeks generally did this for medical reasons, in temples of their god of medicine, Asclepius. A typical example of such a temple is at Epidauros in the Peloponnese in Greece.

In Greek incubation, a sacred dream would come to the lucky person sleeping in the holy spot, and this dream would reveal the means of cure of the ailment. Other forms of incubation might have different aims: inspiration, prophecy, divine guidance, or communion with the divine might be sought instead of cures for disease. A classic book on this subject was written by Mary Hamilton, who says about Isis and "incubation":

If the [account of Diodorus Siculus saying that the goddess Isis healed people in their sleep] were to be taken literally, it would mean that the activity of Isis as an iatromantic [medically prophesying] oracle reached far back into the obscurer centuries, and that incubation had been an Egyptian practice from early times. The importance of the role of Isis in medical science cannot be denied, but Welcker refuses to credit her with the position assigned by Diodorus. He considers that the priesthood established such a tradition at a late date in order to strengthen faith in the new practices of their health-oracles by fortifying them with the assurance of antiquity. He believes that only under the Ptolemies [commencing in the late fourth century BC] did Isis begin to rank as a goddess of healing. . . . It may be that then, for the first time, the practice of incubation became general in Egypt, but as a healing goddess Isis had been honoured many centuries before.<sup>4</sup>

I am inclined to believe that the Sphinx rump tunnel, whatever its original date may be, was known and used during the period when we know that the Sphinx was cleared of sand under the Ptolemies, the period of Greek rule and Greek religious influence subsequent to the fourth century BC. Only the most special visitors, who were prepared to pay the priests a lot of money for the privilege, would have been allowed to sleep overnight beneath the rear of the Sphinx. After all, unlike the temples of Asclepius that could accommodate sometimes dozens of visitors at a time in incubation cells, the hollow beneath the Sphinx could hold only one person at a time. The Sphinx inspired a great deal of awe and at this late period was considered a sacred idol, who was called Harmachis, sacrifices were offered to it as a god, in front of the statue, where an altar existed between its paws (see figures 1.16 to 1.22). To be allowed to sleep beneath the Sphinx would have been a powerful and overwhelming experience, and by the power of autosuggestion alone, aside from any other factors, many clients would have been bound to have apocalyptic dreams. The word-of-mouth reputation would have created a vast waiting list of people wishing to have these experiences, just as there are thousands of tourists today who are prepared to pay extra fees to their tour groups for the privilege of standing between the paws of the Sphinx. People will always swarm to any place of healing, as Lourdes proves in our own day.

The vast stairway leading down to the Sphinx in Ptolemaic and Roman times is shown in figures 6.44 and 6.45, figure 6.45 being drawn shortly after its excavation in 1817. Not a stone of this stairway now

remains, as it concealed a temple beneath, which has now been excavated (the Sphinx Temple). Indeed, this early drawing is apparently the only picture in existence of what the approach to the Sphinx looked like at that period of history. It was clearly designed for the use of large crowds, with smoking altars placed at intervals of the stairway as part of the crowd-management techniques in connection with the public ceremonies and mass access for offerings and worship. Countless offerings left both by the ordinary public and by dignitaries were dug up from around the Sphinx during the various excavations that took place between 1817 and 1937.



Figure 1.16. This old photo from 1896/1897 contains a contemporary inscription that gives us information that I have found nowhere else, namely that Colonel George Raum carried out excavations at the Sphinx in 1896. I don't believe there is any other surviving evidence that these excavations took place. Nor have I ever heard before of the "stone cap." The inscription reads: "Some successful [sic] excavations at the foot of the Sphinx have recently been carried out by Col. Raum. In 1896 the stone cap was discovered—This discovery seems to have been of much advance by Dean Stanley who in his Travels wonders apropos of the colossal head of the Sphinx 'What a sight it must have been when on its head was the Royal Helmet of Egypt.'" (Note: The American colonel George Edward Raum, of San Francisco, arrived in Egypt in 1885. He found a portion of the "rock crown" of the Sphinx in an excavation between its forepaws on 26 February 1896.) (*Collection of Robert Temple*)

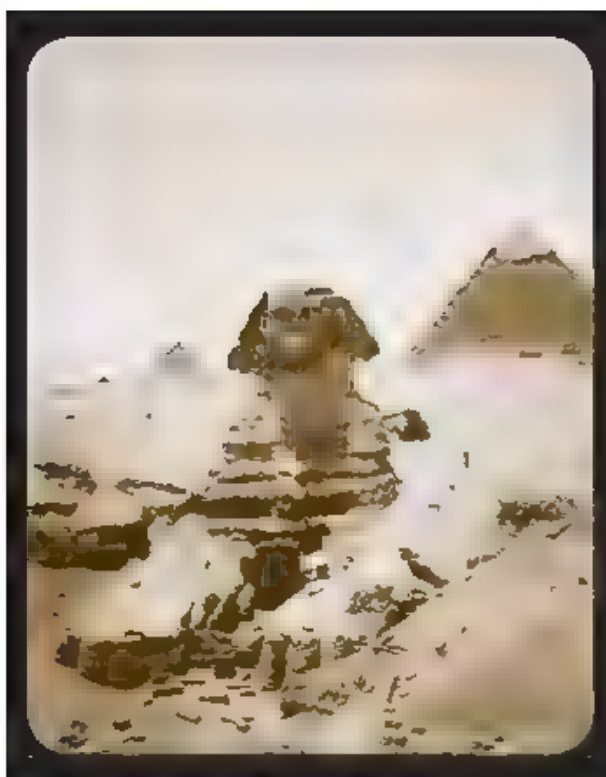


Figure 1.17 This mid- to late-nineteenth-century photo by a French photographer based at Port Said shows the north side of the Sphinx Moat (on the right in this photo) not only totally unexcavated but still containing late overlying structures protruding from the sand. Here—just above the left paw of the Sphinx, we can see the remains of a stone wall, for instance. At this period, the north side of the Sphinx Moat had not been clear since the time of the Roman Empire—in other words, for about 1,800 or 1,900 years. The small stones covering the toes of the Sphinx are reconstruction blocks dating from Roman times. (*Collection of Robert Temple*)



Figure 1.18 This stereoview was taken between 1926 and 1936, since it shows at far right the walls erected by Baraize in 1926 to hold back the sand on the north. The walls were demolished by Selim Hassan in 1936. (*Collection of Robert Temple*)

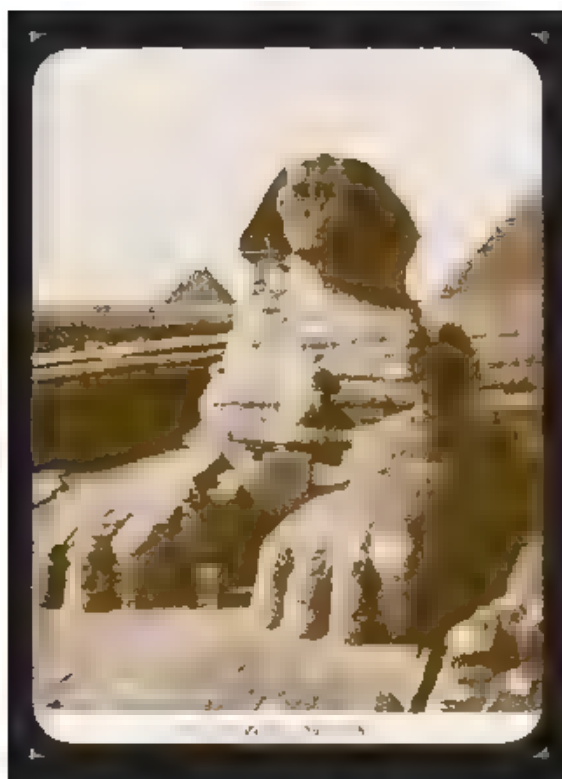


Figure 1.19 This photo shows very clearly the small altar between the paws of the Sphinx, at which offerings were burned during Roman times, when the Sphinx was thought to be a god named Harmachis. Farther back, between the paws and up against the chest of the Sphinx, stands the Dream Stela. This photo comes from Adolf Erman's book *Die Welt am Nil (The World on the Nile)*, Leipzig, 1936, where it is Plate 13 opposite page 58. Erman credits Ludwig Borchardt. This photo probably dates from 1936, immediately after the lappets of the headdress had been "restored" by Selim Hassan, as the new concrete lower portions are still so fresh that they are far paler than the stone. Subsequently, the concrete darkened during curing, and this contrast was no longer so obvious.



Figure 1.20. This photo, probably dating from about 1850/1860, shows the limits of Cavaglia's excavation of 1817. The little wall above the left foreleg of the Sphinx suggests that Cavaglia never cleared the sand much farther than a few feet to the north of that foreleg. As for the south side of the Sphinx (its right, left of photo), the sand was right up to shoulder height. Nevertheless, we can see in the background that the rump is entirely clear. An Arab squats at the base of the Sphinx's neck on the north side.

(Collection of Robert Temple)



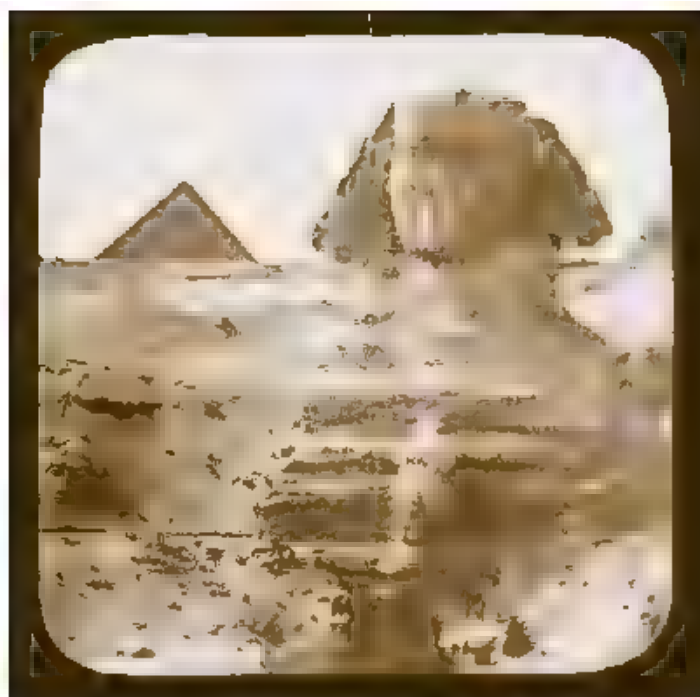


Figure 1.21. I am inclined to suspect this glass slide is very early indeed. It shows the results of Caviglia having tried to make some clearance to the south, and just a bit at the north, of the Sphinx. The photo may be circa 1830, but I am just guessing. (*Collection of Robert Temple*)



Figure 1.22. This very strange photo shows the Sphinx acting as host to a visiting American baseball team! The photo was taken in 1889, and the baseball players were traveling with Albert Spalding, they were known as the Spalding National League. They went on a world tour "to bring baseball, and with it the American way, to the four corners of the earth," as it says in a book by Mark Lamster, *Spalding's World Tour*, New York, 2006. This photo gives a good view of the true condition of the paws of the Sphinx, as they were when still constituted of small stones dating from Roman times, today these are completely covered in modern stones, and none of the Roman ones can be seen any longer beneath the present covering of white limestone blocks. (*Collection of Robert Temple*)



Figure 1.23 A photo circa 1870 showing a man standing on top of the Sphinx's forehead, his arm extended toward the east. Three figures stand on the back, just behind the head. This photo enables us to appreciate the scale of the sculpture, and even though the head is far too small for the body, it still utterly dwarfs the man. (*Collection of Robert Temple*)

Another interesting point is the connection of Isis with incubation, at least by Ptolemaic times. As may be seen in part 2, section 2, where I have gathered travelers' accounts of the Sphinx from Pliny up to the mid-nineteenth century, the tales of the Sphinx dating from the Middle Ages sometimes referred to the statue as "the Idol of Isis." This appears to be a survival of an old tradition that may refer to the association of incubation at the Sphinx with the patron goddess of such things, Isis. There was even a small Temple of Isis nearby during this period, just a short distance northwest of the Sphinx (see figures 1.24 to 1.27). This temple is mentioned by name in an enigmatic stela excavated at Giza that has come to be called the Inventory Stela (figures 5.12 and 5.13). The Inventory Stela is discussed in chapter 5.

The actual passage in Diodorus Siculus (circa 80–20 BC) is interesting to read. First I give it in the charming translation by Booth that was published in 1700, from one of my old leather-bound translation volumes: "The Egyptians report that Isis found out many medicines for the recovery of men's health, being very expert in the art of physick, and contriv'd many remedies for that purpose; and therefore even now when she is advanc'd to an immortal state, she takes pleasure in curing men's bodies, and to those that desire her assistance, in their sleep she clearly manifests her presence, and affords ready and effectual relief to them that stand in need of it."<sup>5</sup>

The modern translation, of which I give a greater portion, is less quaint:

As for Isis, the Egyptians say that she was the discoverer of many health-giving drugs and was greatly versed in the science of healing; consequently, now that she has attained immortality, she finds her greatest delight in the healing of mankind and gives aid in their sleep to those who call upon her, plainly manifesting both her very presence and her beneficence towards men who ask her help. In proof of this, as they say, they advance not legends, as the Greeks do, but manifest facts, for practically the entire inhabited world is their witness, in that it eagerly contributes to the honours of Isis, because she manifests herself in healings. For standing above the sick in their sleep she gives them aid for their diseases and works remarkable cures upon such as submit themselves to her; and many who have been despaired of by their physicians because of the difficult nature of their malady are restored to health by her, while numbers who have altogether lost the use of their eyes or of some other part of their body, whenever they turn for help to this goddess, are restored to their previous condition. Furthermore, she discovered also the drug which gives immortality.<sup>6</sup>

This explicit testimony from a writer of the first century BC makes it very clear that incubation at an Isis center was taking place in Egypt during Greek and Roman times. We can safely presume that this was happening at the Temple of Isis on the island of Philae, in the south of Egypt. However, the only Isis temple I know of in the north of Egypt is the one at Giza. It was so small that it is difficult to imagine incubation taking place there. I believe the evidence warrants the assumption that the cell beneath the rump of the Sphinx was used for incubation, and that the priests of the small Temple of Isis nearby were the ones who arranged this. As for Diodorus's reference to Isis becoming known all over the world for her healing abilities, this refers to the fact that during the Greek and Roman periods, Isis temples were founded all over the Mediterranean. Anyone who has visited Pompeii will have seen the one there, which is so well preserved. There was one in every Roman town of size. The Isis temple in Paris was outside the city walls of the Roman town (known as Lutetia) and was on the site of the modern Church of Saint-Sulpice.



Figure 1 24 This is plate LIV (following p. 140) in Selim Hassan's report of his Sphinx excavations, *The Great Sphinx and Its Secrets: Historical Studies in the Light of Recent Excavations*, volume VIII of the series *Excavations at Giza*, in this case for the years 1936–37, Government Press, Cairo, 1953. This photo shows the chapel of the Temple of Isis at Giza that led into the inner sanctum. On Hassan's plan of the temple (see figure 1 25 below) this chapel is marked "H." This photo appears to have been taken facing north, from the inner sanctum itself looking outward through the chapel doorway. According to Hassan (p. 111), this temple was probably constructed during the Eighteenth Dynasty of the New Kingdom, as we know that King Ay, the successor of Tutankhamun, made an offering there—as did other New Kingdom personalities. After the reign of Rameses II, the temple seems to have experienced a decline, until it was revived in the Saite Period (664–525 BC), when it was once again very important up until the time of the Persian Conquest in 525 BC.



Figure 1 25. This is plate LII from Selim Hassan's book, *The Great Sphinx and Its Secrets*, Cairo, 1953. It shows Hassan's drawing of the plan of the ruined Temple of Isis—which lies at the foot of the Great Pyramid on the eastern side.





Figure 1.26. This photo is plate XLVIII in Selim Hassan's book, *The Great Sphinx and Its Secrets*, Cairo, 1953. It is of a limestone stela excavated in the Sphinx Pit showing the pharaoh Thutmose (Thothmes) IV offering flowers to the goddess Isis, who holds a was scepter in one hand and an ankh in the other. As we have already seen, a late Temple of Isis existed at Giza, though we do not know how far back her association with Giza extended. Clearly, in the New Kingdom, it was thought suitable to honor her in the Sphinx Pit, which was no longer a moat; it was completely dry.



Figure 1.27. A photo taken from the Great Pyramid, looking down on the remains of the Temple of Isis just to the east of the pyramid (the round column bases are part of it). This temple does not date from the time of the pyramids, but was a later edifice, built partially on top of one of the tombs dating from the reign of King Cheops. No one knows whether an earlier Temple of Isis existed at Giza, as claimed by the Inventory Stela, which may or may not draw on Old Kingdom texts. During the Middle Ages, the Sphinx was generally thought to be an image of the goddess Isis, because the *nemes* headdress worn by the pharaoh looked like a woman's bonnet, and people generally could not accept that it was the head of a man. This photo is plate LI in Selim Hassan's book, *The Great Sphinx and Its Secrets*, Cairo, 1953.

An alternative and possibly double use for the rump tunnel occurred to me when I was exploring it: during the worship of the Sphinx, it might have been consulted for oracular revelations. A priest might have lain concealed in the hollow beneath the Sphinx, which he would have entered under cover of darkness and where he would have remained until the following night, and during the daytime he could have spoken through a speaking tube to reply to inquirers' questions. People would have thought the Sphinx itself was speaking. Such tricks were played frequently in Ptolemaic times in Egypt, and trick chambers and passageways, holes for speaking tubes and so forth, can be seen in many surviving ruins of temples such as Kom Ombo and Edfu. The rump hollow is a cozy enough little cell to curl up in for a day

or so, with your water jug and some food beside you, and a chamber pot nearby. Also, as we shall now see, there was a connecting tunnel to help enable such voice tricks to be relayed toward the front of the Sphinx. At the time I thought of this, I had not yet done my searches of the early travelers' reports of the Sphinx and was unaware that many of them had repeated the claims of the local population that someone concealed himself within the Sphinx in ancient times to deliver oracles. The fact that I thought of this idea independently and only later found it confirmed by countless early reports strengthens my conviction that there must be some truth in it. There is no hole in the mouth of the Sphinx by which oracles could be delivered, but as we will see later when we go into much more detail, there was another and better means of doing so.

So the rump hollow was probably either an incubation cell or an oracular hole, or perhaps it served as both. But there is more to it than just that. One's first suspicion is to think that perhaps the tunnel goes down farther, but this does not appear to be possible. I looked pretty carefully at the hollow, and the scooping away of the stone in a rounded fashion is clearly out of the bedrock. This tunnel does not go any farther down, nor was it ever intended to. There was no trace of water. The hole appeared perfectly dry, which is strange considering that water—supposedly from the rising water table—has been reported at *higher* levels elsewhere in association with the base of the Sphinx. The whole question of where water is and where it is not within the underground region of Giza is a complicated one, perhaps made more so by the fact that the limestone of the plateau is riddled with cavities like a Swiss cheese.

But what is very surprising indeed is that the Sphinx rump tunnel *does* continue—upward. After I had finished peering down, my attention was finally drawn to what was above my head. And then I had a great shock, for the tunnel beneath the Sphinx *continues upward into the body of the Sphinx*.

I was certainly not expecting this. The upward tunnel is not straight, and it is rough-hewn. It curves around out of sight, and I was not able to see the end of it. All along the upward tunnel, wooden supports have been erected, as in a mine shaft, presumably to prevent the collapse of the rear of the Sphinx upon itself (see figure 1.28). These wooden props appeared to be very new, placed there at the time of the restoration of the Sphinx in the mid- to late 1990s, during the period when the Sphinx was covered with scaffolding. Although the upward tunnel was largely blocked by these struts, I was tempted nevertheless to crawl along at least sufficiently to have a look around the bend to see an end to the tunnel. But I decided against this idea when the very first wooden support by the ladder, against which I leaned slightly, moved! The possibility of dying inside the Sphinx, crushed by its collapsing rump, did not appeal to me, if only because I could not then make my report. So I was unable to form a personal impression of just how far this extraordinary interior tunnel in the Sphinx actually extended. It went both upward and along, curving up the rear haunch slightly toward the south and then heading around toward the east and disappearing out of sight in the direction of the Sphinx's waist.



Figure 1.28. This is a photo looking upward inside the rump of the Sphinx. It shows the commencement of the tunnel that curves up inside the Sphinx from the top of the Sphinx's right hip until it comes to the point where Baraize filled it with cement in 1926. Before he did that, it certainly went at least as far as the crevice where the haunches had been broken off from the main body for centuries, until Baraize joined them again. That was the point where the shaft and burial chamber had been intruded into the Sphinx. The shaft and this tunnel would therefore once have intersected. Whether this tunnel ever continued beyond the shaft, farther forward to the front of the Sphinx's body, is entirely unknown to us now. Several wooden props have been placed here to support the Sphinx from inside, making it impossible for anyone to squeeze past them and crawl along this tunnel. (Photo by Robert Temple)

It is immediately obvious that this interior tunnel provided a very convenient means in antiquity of conveying a crawling person who had slept overnight in the hollow, or alternatively of conveying his voice along a speaking tube to a forward part of the Sphinx, whether the area of the hips or beyond, so that oracular pronouncements could have been made and superstitious people would genuinely believe that the Sphinx had spoken to them with its voice. The actual location from which utterances might have emerged is something I will discuss later, but it was certainly not on the Sphinx's face or head. (There is a hole in the top of the head, but it was drilled for another purpose and does not connect with any other holes.)

Because I am a friend of the limestone expert Professor Lal Gauri, who worked for some years in the late 1970s with Zahi Hawass and Mark Lehner on the stone of the Sphinx, I sent him an e-mail asking him about this strange interior tunnel in the Sphinx. I knew that he too had been down the rump tunnel. He replied that he had also noticed the tunnel continuing upward and bending around out of sight, but he had not crawled along it or explored it either. He knew no more about it than I did.

If an expert who worked on the Sphinx for years does not know how far the tunnel goes, then the number of people who do must be very small indeed.

Perplexed, I talked to someone else about the matter. He had some familiarity with the tunnel. He told me the Sphinx tunnel "goes 6 meters down and 8 meters upwards." By that he meant that the hollow was 20 feet beneath the Sphinx base, and that the upward tunnel had a length of 26 feet, meaning that it went about twice as far as I could see. What happened then he didn't say clearly, except that it apparently came to an end of some kind. But unlike the hollow, which seems to stop at bedrock, one could presumably never be sure if something like an interior tunnel really ended naturally or had been blocked by a later



repair. The hip area of the Sphinx has experienced a great deal of weakness and been repaired at various times throughout history. The question we have to keep firmly in mind is this: Why would anyone drive such a long tunnel along the length of the Sphinx if there was no purpose, or no objective at the end of it? It had to lead to *something*.

It was not until January 2001 that a colleague kindly gave me a photocopy of an article about the Sphinx Tunnel that had been published by Zahi Hawass and Mark Lehner in 1994 in a French Festschrift for the Egyptologist Jean Leclant.<sup>7</sup> This article gives a very full account of the rump tunnel. But previous to seeing this article, I had been puzzled at the lack of information available about it. Hawass published a booklet about the Sphinx four years later in which he gave relatively few details, and there was no indication in this later work that there was an earlier and fuller publication on the subject. In this brief booklet, *The Secrets of the Sphinx*, published in 1998, Hawass writes only this:

### **Tunnels under the Sphinx**

Over the years, the Sphinx has revealed some of its secrets, though not all. In 1881 [sic; Vyse actually worked at the Sphinx in the 1830s] Henry Vyse found two tunnels inside the Sphinx, but his discovery was never published. In 1979, we opened these tunnels. [It was at this time that my friend Lal Gauri was working with Hawass on the Sphinx and went down the rump tunnel.]

The first tunnel is located behind the head of the Sphinx, cut into the mother rock about six meters. The second tunnel is located in the tail of the Sphinx. We learned of it from Sheikh Mohamed Abd al-Maugus, who in turn knew of it from his grandfather. It too is cut into the mother rock, about twelve meters. We found no significant artifacts inside the tunnel, but the evidence suggests that the tunnels were cut during the pharaonic period, I believe during the Twenty-sixth Dynasty [664–525 BC].

A third tunnel in the north side of the Sphinx, has not been opened since 1926, when Emile Baraize opened it. We have photographs showing two workmen inside it.<sup>8</sup> [These are the archive photos taken by Pierre Lacau in 1926, which I was not permitted to see, as I describe later.]

This was all he said, and it left me wondering: Why has no one explored the tunnel, which has been unopened since 1926? In figure 1.37 Olivia stands in front of this blocked doorway. It is so obvious that someone should remove some of those modern stones and have a look at what is behind them. Why has no one done that?

Another question I have is this: What evidence suggests that the rump tunnel dates from the Twenty-sixth Dynasty? If no “significant” artifacts were found inside the tunnel, what were the *insignificant* ones? In fact, I know what one was: Hawass told me he found an old pair of shoes at the bottom of the rump tunnel. But he did not say shoes of which period. Were they modern? Ptolemaic? Turkish? (They were evidently modern but not recent, as I later discovered.)

The 1994 article published in the French Festschrift is relatively little known. Leclant is a famous figure in Egyptology, and I met him in 2000. Presumably because he and Hawass have been friends since 1976, his Festschrift was chosen as the vehicle for this publication, but awareness of the article outside of professional Egyptological circles has been nil. For instance, it was obviously unknown to Paul Jordan, who wrote a book in 1998 that was entirely devoted to the Sphinx.<sup>9</sup>

When Jordan’s book was published, I was overjoyed and rushed to order it. At last I would get some answers to the Sphinx tunnels, I hoped. But no, not at all. Sphinx tunnels are mentioned only twice, and we are told very little. On page 5, the author says, presumably drawing upon Hawass:

There are three passages into or under the Sphinx, two of them of obscure origin. The one of known cause is a short dead-end shaft behind the head drilled in the nineteenth century. No other tunnels or chambers in or under the Sphinx are known to exist. [This is demonstrably untrue; anyone can see the small chamber underground between the paws, for instance. A photo of the entrance to it may be seen in figure 1.29. And we shall see as we go along that the tunnels and chambers are more than we imagined.] A number of small holes in the Sphinx body may relate to scaffolding at the time of carving.

And on page 25, the same author adds:

Helferich [a sixteenth-century traveler, more correctly known as Johann Helffrich, or in Latin, Johannes Helfricus, who mentioned the Sphinx in his book of travels written in German in 1579,<sup>10</sup> to which Jordan gives no reference or title, however] adds a teasing detail that echoes down to our own day when he tells that “from afar, under the ground, through a narrow hidden passage, one can pass unseen. By this passage the heathen priests get inside the head and speak to the people out of it as if the statue itself had spoken.”

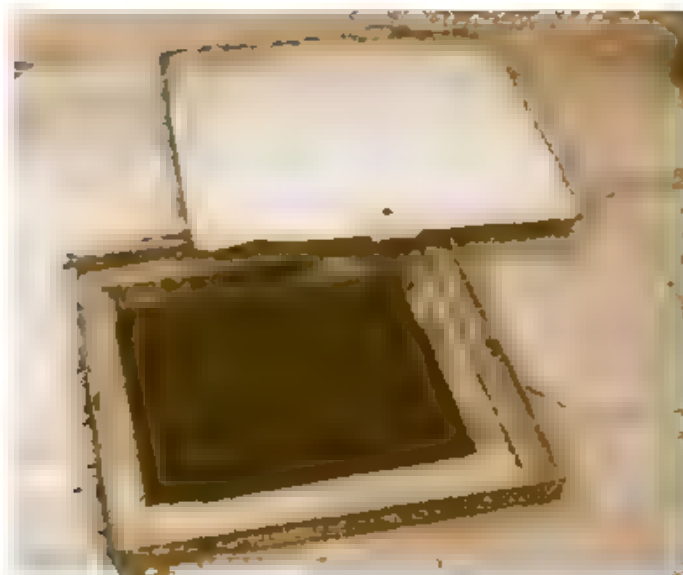


Figure 1.29 I lifted the lid and took this photo of the modern metal frame that has been inserted into the bedrock floor of the Sphinx Pit between the feet of the Sphinx. This is the entrance to the underground chamber in front of the Sphinx. Not only is the metal covering a modern one, but the chamber inside now contains modern bricks, put there by Henry Salt. A tunnel originally led off from this hole underground, but it was blocked in 1817 or 1818 by Henry Salt, according to an account left by Count Forbin, so we do not know where it led. This small chamber in the rock is probably where someone giving oracles sat and spoke through a tube to convince people that the Sphinx itself was speaking to them. I suggest that this happened not originally, but rather after the Sphinx was cleared of sand by King Thutmose IV during the New Kingdom, and then again after the Sphinx was later cleared repeatedly during the Twenty-sixth Dynasty, the Ptolemaic Period and the Roman period. During these later periods, the Sphinx was worshipped as an idol in a superstitious fashion. (Photo by Robert Temple)

That is all. But in our consideration of early descriptions of the Sphinx, as we shall see, there were many such accounts given by early travelers of secret passages and tunnels. Indeed, there are so many such accounts in my compilation of the earliest reports, which extends from Pliny until 1798, that they are rather overwhelming. (Later reports are in part 2, section 2, which presents early-nineteenth-century travelers' accounts.)

Although the 1994 article by Hawass and Lehner has received little or no attention, it is the definitive account of the rump tunnel, and we must see what it has to tell us. The story of the discovery of the rump tunnel in modern times is absolutely fascinating, not least because the existence of this tunnel was



revealed by a man named Mohammed Fayed (not the father of Dodi Fayed, the late Princess Diana's boyfriend). I quote the beginning of the Hawass and Lehner article:

It is an age-old notion that the Sphinx conceals some sort of passage, tunnel, grotto, or chamber. The idea enjoys wide currency today in popular nonscientific publications about the Giza monuments.

During our work at the Sphinx, three elderly men in the employ of the Antiquities Organization at Giza told us of a passage under the rump of the Sphinx. They said that they saw the passage when Baraize revealed it in 1926 during his cleaning of the Sphinx, for which they worked as basket carriers. They said that the passage opened at floor level on the north side of the rump as it curves from the beginning of the tail. One of these men, Mohammed Abd al-Mawgud Fayed, recalled, some fifty-seven years after Baraize's excavation, that the opening of the passage was a round hole just under the masonry veneer. The passage descended to the water table under the Sphinx.

Like so much of Baraize's work, the passage went entirely undocumented and, since it was covered with masonry, it was nearly forgotten. Since the water table is a critical factor in the preservation of the Sphinx, and because such a passage would be an important part of the history of the statue, we decided to investigate these claims. Baraize covered the opening of the passage with stones and cement. It had been almost six decades since Mohammed Abd al-Mawgud had last seen the opening. Nevertheless, Mohammed was able to point to a specific brick-sized stone, bonded with modern cement, that could be removed to reveal the opening.

On October 16, 1980, we moved this single small slab to expose a grey cement packing characteristic of Baraize's repairs on the Sphinx. We forced a small hole through this packing and found that the bedrock floor dropped off into a cavity under the brick-sized veneer masonry that Baraize had replaced. Behind the brick-sized and cement/limestone packing Baraize had set a large limestone slab to bridge the opening of the passage. We moved the bridging slab to allow easier access. Behind it were two larger slabs set end to end to bridge the opening.<sup>11</sup>

It is good to have this candid tale on record, revealing how an attentive ear to the tales of the workmen can often result in the most significant discoveries in archaeology. We should also note that although the rump tunnel was discovered in 1980, it took fourteen years for an account of it to be published by its discoverers. Such are the delays of archaeological publication. That also explains why Lal Gauri was unaware of it, as no one bothered to send him a copy fourteen years later, and he does not read French Egyptological Festschrift volumes as a hobby, not being an Egyptologist.

The Hawass and Lehner article reveals the official measurements of the rump tunnel:

The passage consists of an upper and lower part. . . . The lower part descends from a circular hole in the floor where it meets the rise of the bedrock core body. It slopes downward at a very steep angle towards the northeast, for a distance of 4 m. and a depth of 5 m. and terminates in a cul-de-sac in the natural rock. Just inside the entrance, the passage is 1.30 m. wide and narrows to 1.07 m. near the bottom. . . . The upper part of the passage rises to a height of 4 m. above the Sphinx floor and ends in a niche about 1 m. wide and 1.80 m. in height. It is about 1 m. wide at the lower end and measures 1.80 m. in width just before the niche.<sup>12</sup>

Hawass and Lehner give no measurement of the length of the upper part of the passage in their report, or of how far it actually extends into the body of the Sphinx. They mention only how high it goes (13 feet).

Today, with the upper passage filled with wooden struts, it would be nearly impossible to make measurements of it or even to explore it. All the struts would first have to be removed, and whether that would be safe I cannot say, as their existence has not even been admitted by archaeologists, so we cannot draw any conclusions about their necessity.

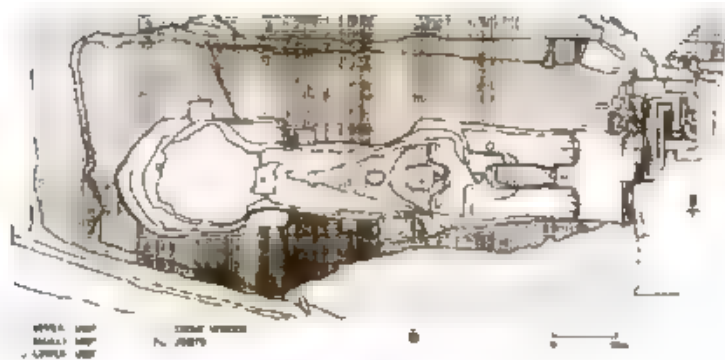


Figure 1.30. This is Professor Lal Gauri's plan of the Sphinx as seen from above. The huge blob of cement that Émile Baraize stuffed into the shaft at the haunches of the Sphinx may be seen here. And running across that blob diagonally, northwest to southeast, is the major fissure in the bedrock beneath the Sphinx that he found. This fissure goes directly across the point at which the subterranean burial chamber lies and was possibly caused by the shocks to the bedrock due to construction when that shaft and chamber were intruded, as they are most unlikely to have been original features of the Sphinx. The surviving description of the burial chamber as having walls covered in hieroglyphics would appear certainly to rule out any date prior to the Fifth Dynasty (hence excluding both Pharaohs Cheops and Chephren) and probably indicate an intruded shaft and chamber dating from Saite times (664–525 BC, ending with the Persian conquest of Egypt), which could even make Pliny's assertion that King Amasis was buried beneath the Sphinx absolutely correct. This drawing is reproduced from K. Lal Gauri, "Weathering and Preservation of the Sphinx Limestone," in *The First International Symposium on the Great Sphinx, Book of Proceedings*, Cairo, 1992, p. 54.

As the reader may have gathered, the "restorations" by the French archaeologist Baraize were pretty drastic and heedless. Figure 1.31 is a particularly rare photo I found of the Sphinx taken circa 1920, before Baraize did the "restorations." This photo was used as the frontispiece to a book published in German by a Polish scientist, Klaus Kleppisch, in 1921, of which I believe no copy exists in Britain except for my own private copy, which I acquired from Switzerland through a German bookseller.<sup>13</sup> Certainly no copy is to be found in the British Library. The photo is taken from an unusual angle, on what we now know as the Chephren Causeway, and it is very revealing.

In the photo we can see that a huge fissure at that time existed in the region of the hips of the Sphinx, and that the entire rump of the Sphinx was effectively detached from the rest of the body. This is not just a minor detail! Because this now vanished feature is so important, I have spent some years collecting other photos that show it; see figures 1.32 to 1.34. These photos are taken from varying angles and help us evaluate the precise nature of the fissure as it existed prior to 1926.

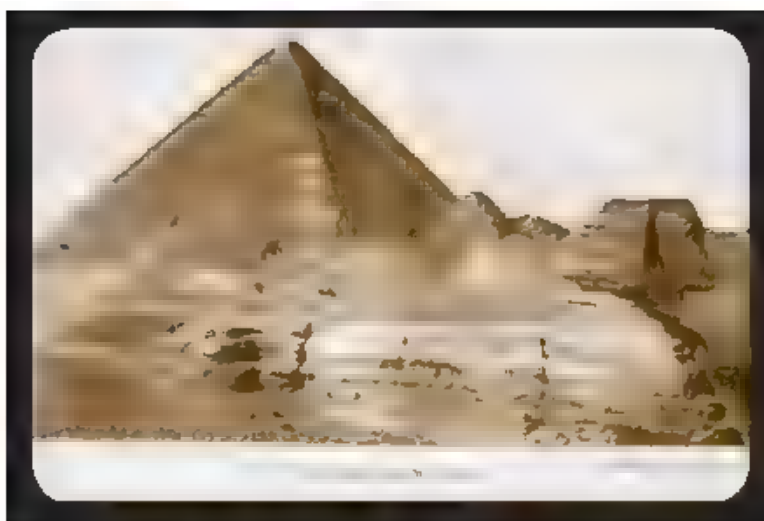


Figure 1 31 This photo, published in 1921, just a few years before Baraize filled it full of cement, shows clearly the cleft separating the main portion of the Sphinx from its rump. The rump had by this time split away due to the structural weakness in the stone caused by the hollow shaft that led down through the entire body of the Sphinx to the burial chamber beneath it at that point. The shaft was not original, but a later intrusion to enable a pharaoh to be buried in a chamber beneath the Sphinx, possibly a Saite pharaoh of the Twenty-sixth Dynasty, the last native Egyptian dynasty (664–525 BC). The Saites were obsessed by the Giza Plateau, and as part of their restoration efforts they may have partially or wholly cleared the Sphinx of sand, or at least cleared enough to give them ready access to the back so that they could make the shaft. By 1926, Baraize had entirely obliterated this evidence and permanently filled in the shaft with cement, thus making access to the subterranean chamber impossible. The rump tunnel inside the Sphinx also now terminates at this point, where Baraize's cement oozed into the tunnel and blocked it too. How far the lateral tunnel may have extended forward into the Sphinx's body, past the cleft and toward the chest, cannot now be determined. This photo appeared as a frontispiece in a rare volume that is not to be found in either the British Library or the Library of Congress, *Die Cheopspyramide Ein Denkmal mathematischer Erkenntnis* (*The Cheops Pyramid: A Monument of Mathematical Knowledge*), by the brilliant Austrian engineer Klaus Kleppisch, who lived in Warsaw (Verlag von R. Oldenbourg Munich and Berlin, 1921; collection of Robert Temple)



Figure 1 32 A photo circa the 1860s, showing at extreme left a particularly good view of the “rump crack” of the Sphinx at the point of the shaft leading to the subterranean tomb chamber. At this period, the Valley Temple (on top of which the woman at right is standing) was still entirely covered in sand. The sand that had covered the back of the Sphinx during the 1830s, as seen in the earlier figure 1 4 has now been cleared away again. The low wall of small stones on which the man is seated has long vanished. It was of some late structure of which we know nothing and which probably had no archaeological importance. When tourists became more frequent in late Victorian times, sheds to cater to their needs were erected where these two people are seen, and they all had to be torn down at the beginning of the twentieth century to enable the Valley Temple to be excavated. (Collection of Robert Temple)

Figure 2.12 is my own photo of this region where the fissure once was, and a careful comparison of my photo with the earlier ones reveals the full extent of the massive infilling and “restoration” undertaken by Baraize. In figure 1 30, a drawing of the Sphinx seen from above, the area of infill can also be seen as a massive blob of restoration. And as we will see later in another early traveler’s report, there was definitely once a rectangular entrance into the Sphinx here, measuring 4 feet by 2 feet, which restoration,



either in the nineteenth century or in the 1920s, has completely sealed and obscured. The importance of this particular area is that it is the very area where the upper passage inside the Sphinx now terminates in a wall made with modern cement and placed there by Baraize

In 1920 possibly, or certainly in the early nineteenth century, if one had been prepared to dig out large quantities of sand, one could have descended through the hip fissure of the Sphinx and presumably gained entry not only to the upper passage but also to any continuation of it carried farther forward in the body of the Sphinx and now sealed and forgotten, as the rump tunnel itself was almost forgotten. And in fact, as we shall learn later on, it was in this region that entry to another very remarkable subterranean chamber was effected, descriptions of which from three successive centuries have turned up in my search of original source materials. But we have to leave the description of that until later, as we must first complete our study of the rump tunnel.

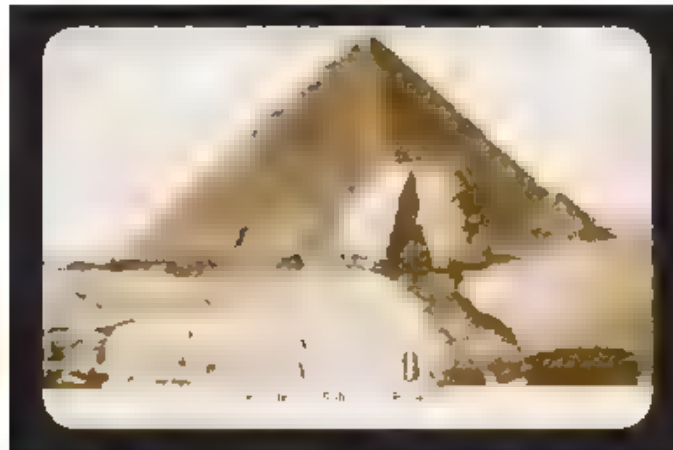


Figure 1 33 This photo from a postcard that was mailed from Cairo to France in 1909, shows clearly the split-off and detached rump of the Sphinx prior to 1926, just as does the photo seen in figure 1 31 In this photo, we also see that there was a vertical crack at the front of the Sphinx's body not far behind the head An Arab is standing on the Sphinx's right shoulder The three specks along the Sphinx's flank, which look as if they might be holes, are, in fact, Arabs (*Collection of Robert Temple*)



Figure 1 34. An early photo of the Sphinx by W Hammerschmidt, dated 1829 Just beside the rear of the horse on the left may be seen the large crack in the Sphinx's haunches leading to the shaft and the tomb below (*Collection of Robert Temple*)

Let us see now how Hawass and Lehner describe the upper stage of the rump tunnel:

The upper part of the passage runs along the curve of the bedrock profile of the statue but is covered by large Phase I restoration blocks. These blocks are covered in turn by the thinner Graeco-Roman (Phase III) and 1926 masonry [put there by Baraize]. Without these layers of masonry, the upper part of the passage would be an open trench in the Sphinx core body. . . The top [that is, the termination] of the passage is sealed off by the Phase I blocks and a large patch of modern cement. Although it is difficult to know for sure, it seems most likely that the Phase I blocks do not entirely seal off the passage. The cement probably spilled down into the passage from the filling of the space between the Phase I slabs and the bedrock core on the ledge of the masonry at the upper part of the rump, about 3 m. above the passage.<sup>14</sup>

Figure 1 in the Hawass and Lehner article shows a drawing of the passage from above, and from this it is evident that the “cement fill” at the end of the upper part of the passage must extend for at least 6 to 10 feet. Such a massive filling of cement effectively destroyed the passage at that point and rendered examination of it nearly hopeless. What happened beyond that point is therefore unknown. There are no old Egyptian workmen left alive today who can shed any light on this, and 1926 was therefore the last time anyone was to have any opportunity to know the full story. Baraize really messed things up. And as we have already seen, it is only because of three old men in 1980 that the existence of the bottom part of this passage was ever known at all. If they had died earlier, the rump tunnel would have remained unknown forever. So near did we come to total ignorance. Instead, we are left today with only partial ignorance.

When we come to the evidence of 1715 and earlier, we will reconsider this matter of the tunnel that ends in a sea of cement, and whether in the period prior to its being blocked forever by Baraize the situation might have been rather different. Of course, we will have to keep an eye on just how much of the Sphinx was buried in sand at any given time. And because so much of it was buried for so long, the fact that the rump was effectively detached until 1926 is of particular importance, affording, as it may have done prior to 1926, a possible access route to the interior of the statue from above. And in connection with this idea, we have to keep in mind the proprietary interests of the inhabitants of Nazlet el-Samman, the Sphinx village, where a single family of local inhabitants may well have profited from this very route into the Sphinx, repeatedly covering and uncovering the entrance to the fissure when they had foreign customers who would pay for access. There are inhabitants of the same village today whose houses lie over important antiquities, such as Sabry Hatab, who, I am informed by local people, actually lives on top of the remains of the Valley Temple of Cheops! As he has no inclination to tear down his house, the temple remains officially unexcavated. It was discovered in recent years when a sewage system was installed for Giza. Perhaps Mr. Hatab will one day change his mind and decide to become a hero to archaeology.

We know about one end of the rump tunnel, although we can never properly know about the other. But what can we know about its origins? It is very interesting to learn that if the Phase I casing stones had not been laid over it, it would be an open channel. This means that the date of the Phase I casing stones takes on an even greater than usual importance. Whatever their date, they are later than the rump tunnel, since they are on top of it.

Hawass and Lehner are very clear about the Phase I casing stones. They say that there are two possibilities: either they date from the Fourth Dynasty of the Old Kingdom (circa 2500 BC) or they date from the Eighteenth Dynasty of the New Kingdom, a thousand years later. Hawass and Lehner are open to either possibility:

We might consider the possibility that the lower casing blocks are part of an earlier, IVth Dynasty, casing that finished off the lion body of the Sphinx. The three courses of Phase I casing next to the bottom course are thicker than the blocks immediately above them. . . In profile, the lower veneer of large blocks looks like the masonry casing on Old Kingdom mastabas at Giza. . . . The blocks above the lower three or four courses are thinner, but they also have the appearance of Old Kingdom casing, the range of their thickness is matched by that of slabs forming the walls of the Khafre causeway where it meets the Valley Temple . . . As mentioned, it is clear that the natural Member II bedrock of the core body [of the Sphinx] was severely weathered before the application of Phase I casing. The major obstacle in assigning Phase I to the IVth Dynasty as the finish work for the Sphinx body, is the Phase I masonry fills in the deep recesses caused by the weathering away of the softest beds.

It is also clear from a detailed study of the Sphinx chapel, located between the forepaws, that the earliest phases of masonry on the statue, including Phase I masonry on the chest and very large blocks behind the granite stela of Thutmose [Thutmosis] IV, are, in fact, XVIIIth Dynasty. At this time the Sphinx was excavated [having been covered up to its neck in sand for centuries], found in weathered condition, and its lion body reconstructed. The XVIIIth Dynasty restorers probably took the Phase I blocks from the Khafre causeway, in effect taking apart the monuments . . . to reconstruct the Sphinx as Horus-in-the-Horizon.<sup>15</sup>



Figure 1.35. A close-up of some of the restoration on the Sphinx. The central limestone blocks are believed to be of Old Kingdom date, from the first repair job, but modern cement has been smeared into the cracks between them. Above them have been laid modern limestone pieces, carefully fitted to the surface and below, larger limestone blocks have been cut and inserted into holes where older blocks had fallen out and been lost. (Photo by Robert Temple)

Of course, if the Phase I casing blocks on the Sphinx were used to repair a weathered Sphinx body, as this report seems to indicate, and if those blocks were placed there in the Fourth Dynasty, then it means that the Sphinx is considerably older than the Fourth Dynasty. But at the moment, the orthodox view in Egyptology is that the Sphinx was carved in the Fourth Dynasty and cannot possibly have needed repair of its weathering, since it was brand-new.

At the Eighth International Congress of Egyptologists in Cairo in March 2000, I attended a talk by Dr. Rainer Stadelmann, former director of the German Institute in Cairo. Dr. Stadelmann wished to discuss whether the Sphinx had been carved by Cheops or Chephren, which is a difference of only a few decades



at most. Such intense passion was aroused by this apparently insignificant point that Dr. Zahi Hawass rushed up from the audience onto the podium to say into the microphone that he differed from Stadelmann! He then proceeded to give a mini-lecture of his own while the hapless Stadelmann stood beside him, pointing out that the pharaoh could not be the one Stadelmann preferred, and that Stadelmann was hopelessly wrong. Stadelmann preferred Cheops, but Hawass insisted on Chephren, which frankly seems too small a difference to matter very much. But certainly passions ran high, and voices were raised over this small matter. What, then, would be the reaction to the suggestion that the Sphinx was not carved by either pharaoh, but was really older? Please do not think that I am one of the people who believes that the Sphinx is twelve thousand years old! I am certain it is not. But surely it is possible to have a legitimate opinion, without being shouted at, that the Sphinx may be older than both Cheops and Chephren, indeed may have been repaired by one of them with the Phase I casing blocks, while still being of an age that is rational and does not require theories of Atlantis to explain it.

However, judging from the fact that one cannot even suggest the “pharaoh next door” as a builder at a supposedly sober international scholarly conference without having the microphone grabbed out of one’s hand and being told one is wrong, and having an impassioned counter-speech made beside one, to make a bolder suggestion would seem to be more than one’s life is worth in Egyptological circles.

Before we leave the Phase I casing blocks that cover the rump tunnel, I should give my own opinions and those of someone whom I regard as the leading expert. Figure 1.35 is a close-up photo I have taken of these blocks, from which it may be seen of what good quality they are. They are really the finest possible limestone masonry, expertly prepared and laid, and so superior to all other blocks (including the most recent) on the Sphinx as to put the others to shame. I have no doubt that these Phase I blocks are of Old Kingdom date, as no one later than that had the skill to produce and lay such stones, in my opinion. It was quite beyond the capabilities of the masons of the New Kingdom’s Eighteenth Dynasty. One only has to look at the pathetic Eighteenth Dynasty temple remains beside the Sphinx (the small ruined temple at a high level, since the Sphinx Temple was buried in sand then and only excavated later in the New Kingdom) to see the stark contrast in building capabilities. At least that is what I think. But I am not alone. I asked my friend Lal Gauri, the limestone expert who worked on the Sphinx with Hawass and Lehner, and he was inclined to believe that these stones were of Old Kingdom date, because of their remarkable quality of workmanship.

Now let us turn to the account of 1715 that reports entry into a chamber beneath the Sphinx. This is the first occasion in our times when documentary evidence has been presented that reports the discovery of such a chamber. In the next chapter, I reveal that many such reports have actually been published and discussed even up until 1953, but subsequently they have been systematically ignored because they did not fit the preconceived views of Egyptologists of the past half century, when consensus opinions have become far more ossified and intolerant than in the past, a sign of extreme decadence in the discipline of Egyptology as it exists today.

With all the books that have been written on the subject of the Sphinx since 1953, there has been no such evidence. Now at last we have real evidence, rather than merely the claims of a psychic in a trance, of the existence of an underground Sphinx chamber, and later we shall see that there is much more. Strangely enough, the evidence presented in this and the following chapter actually substantiates with a series of published eyewitness reports the “psychic reading” of Edgar Cayce concerning the Sphinx, at least insofar as he insisted on the basis of a psychic vision that there was an underground chamber there. We can now prove that he was correct about this general point. Although he “saw” a chamber in a different place at the Sphinx (and the existence of that one remains to be proved), he was correct in

insisting on the existence of an underground chamber at the Sphinx. The mistake his followers have made subsequently was to not even attempt to search for the material that I have found. But that is presumably because followers of Edgar Cayce do not tend to be scholars and do not know how to do this sort of thing.

In any case, scholars are a vanishing species these days, and as they all die off, they are not really being replaced, due to the collapse of the Western educational systems (in contrast to that of China, which retains rigorous standards of excellence in education that perversely decadent Westerners have thrown overboard) and the impact of the information deluge, which has drowned out serious research and replaced it with the ludicrous substitutes of Google and Wikipedia. Those Internet sources, as with all such information sources based on nonrigorous data supply, are riddled with errors and misinformation and are often worse than worthless, since there are no safeguards against their being incomplete, misleading, and frankly wrong. Barely anyone is being trained these days to do real research in information that predates 1990 and depends on printed or manuscript materials, so that in twenty or thirty years' time, there may not be a genuine scholar left alive anywhere on the planet. Then, the lack of the ability to discover the truth about anything will be one of the main precipitating factors that will contribute to a total collapse of what humans have struggled for millennia to create: something fast vanishing called "civilization."

The first passage we will now examine occurs in the English translation of 1715 of a book written in Latin and first published in 1599. On further research, I discovered that the account did not appear in the original Latin text at all, so that it does not go back to 1599, but first appears in print in 1715. It was some information inserted by the English translator himself. To give him justice, he does freely state at the front that his translation contains such additional material. But we are handicapped by a major problem: he is anonymous, and we have no idea who he was!

The book concerned is a curious one, about which I have already had a lot to say in my earlier book *The Crystal Sun*. It was originally written by the Italian antiquarian and polymath Guido Pancirollo (in Latin, Pancirollus), but he died before it could be published, and so his close friend, a noted German antiquarian, Henry Salmuth, edited the work, added much material of his own, and saw it into print in 1599. It was published in the obscure Bavarian town of Amberg. Its title in Latin was *Rerum memorabilium iam olim deperditarum & contra recens atque ingeniose inventarum: Libri duo*, the translation of which was entitled *The History of Many Memorable Things Lost, Which Were in Use Among the Ancients: And an Account of Many Excellent Things Found, Now in Use Among the Moderns, Both Natural and Artificial*, and it was published at London in 1715 and reissued in 1727. I am fortunate to own a copy of this book in translation.

Since it is the translator of this book who tells us about the underground Sphinx chamber, as I shall describe in a moment, it is galling that he suffered from an overdose of modesty and refused to identify himself. That he was no humble clerk but rather an eminent and witty scholar is evident from his four-page "Preface of the Translator." This man regales us with his encounter with a pompous Oxford scholar whom he then lampoons. He heaps praise on the "genius" Robert Boyle and speaks of the contemporary scholar Mr. Glanville as if he were his equal. He then confidently says of Salmuth's annotations to the book: "I have par'd off the Excrescences of his luxuriant Style, and have pick'd out of his Notes the most pat Illustrations; to which I have added some Histories of my own, and some Observations and Remarks, such as I have met with in my slender Reading, and which I thought agreeable to the Argument in Hand."

These are not the comments of an unaccomplished man; they are the assurance of a man who knows his own worth in the scholarly field and seems to be a man of science of some kind. He must have been a person of note in his time. On the title page he further explains, or his publisher explains for him. "Now



done into English, and illustrated with a new Commentary of choice Remarks, pleasant Relations, and useful Discourses, from Salmuth's large Annotations; with several Additions throughout." And further: "To this English Edition is added, First, A Supplement to the Chapter of Printing, shewing the Time of its Beginning, and the first Book printed in each City before the Year 1500. Secondly, What the Moderns have found, the Ancients never knew: Extracted from Dr Sprat's (late Bishop of Rochester) History of the Royal-Society, the Writings of the Honourable Mr. Boyle, the Royal-Academy at Paris, &c."

Among the large "Additions throughout" are the comments on the Sphinx chamber, which appear to come from what the translator wittily calls his "slender Reading," which we can be sure was anything but slender. But alas, what could be the source on which he drew? It has never come to anyone else's attention. But, then, this book itself has never come to anyone's attention either. Not any modern person concerned with Sphinx chambers, I mean.

Here, then, is the brief and tantalizing description of an underground Sphinx chamber given by this 1715 translator:

I imagine this Sphinx to be a Sepulchre, but we cannot understand how it belong'd to Amasis [the Greek name of a pharaoh whom he mentioned earlier, said by Pancirollo to have constructed the Sphinx], for all the Records and Traditions of this Sphinx are lost. That it is a Tomb, may appear, 1. By its Situation, which is in a Place, which was in former Ages a Burying-Place, and near the Pyramids and mortuary Caves. 2. It is to be imagin'd that it was a Sepulchre from its building. In the hinder Part is a Cave under Ground, of a Bigness answerable to [an eighteenth-century expression meaning "comparable to"] that of the Head, into which the curious have look'd, by an Entrance that leads into it; so that it could serve no other Purpose but to keep a dead Corps [*corpse*] in, as Travellers inform us.

Earlier, Pancirollo (page 104) specifically states that the circumference of the head of the Sphinx is 102 feet. (Incidentally, he also says its body is not that of a lion but of a marmoset!)

Here we have a puzzle and several problems. The translator has not himself seen this Sphinx chamber, but has taken the description of it from "Travellers." There were indeed many accounts written by travelers prior to 1715, but which travelers? We are not told, and if they were the well-known ones, someone would have noticed an account of the chamber, surely. However, I realized that at least one such clear account must exist. I was certain that otherwise our translator would not have made this statement so confidently, especially as he does so not to impress us with the mysterious existence of a chamber, but to support his belief that the Sphinx contained a tomb. The translator does not give any indication that he thinks the existence of a Sphinx chamber anything at all unusual; to him it is merely another detail of the monument that he takes for granted, and his passing reference to it in the context of an argument gives us no reason to believe that he made this up. We are left, then, with the enigmatic description and must try to account for it.

The first thing that bothers us is that the size of the chamber is comparable to the size of the head, which the same book states to be 102 feet in circumference. The "den" at the end of the Sphinx's rump tunnel into which I crawled is hardly of that size! It may be perhaps 12 feet (4 meters) in circumference.

Then there is the problem of access. In the early nineteenth century, the Sphinx was covered up to its neck in sand. So how did the travelers prior to 1715 get into anything at all at the rear of the Sphinx, much less a chamber? Here, however, we remember the fissure shown in figures 1.31 to 1.34 and the possibilities of entering the body of the Sphinx by squeezing down it prior to 1926, or at least prior to

1817, when Henry Salt began blocking up entrances into the Sphinx, as described later. Since the top of the Sphinx's back was easily reachable, if this upward tunnel prior to 1715 broke through to the surface, which is highly possible, "the curious" might have descended into it as a matter of course on their visits to the Sphinx. And this would take them inside the Sphinx's rump. This therefore leads us to the possibility that there may be another and larger chamber beneath the Sphinx's rump, perhaps farther forward, reachable from the upward tunnel by a different route that has long been blocked up and in modern times has not been unblocked. Even before the entire area was filled and thoroughly smeared with cement by Baraize in 1926, it is most likely that there was a concealment by some family of local tour guides, as I suggested a moment ago, of some special entrance into this fissure. For the extremely poor local inhabitants, to have even a single private trick to offer the discerning tourist might make the difference between eating for a week or going hungry. All of us who know Giza at all well know the truth of this. Any Giza taxi driver (and to call them loquacious is the understatement of the year) will explain to you in five minutes that if he loses a fare, his family cannot eat. Allowing for bravado and exaggeration—and there is plenty of that—the realities of life in Cairo are that if you are not rich, you are very, very poor. And being poor in Cairo is a form of desperation no Westerner would ever wish to experience, since such poverty in the West did not even exist in living memory and is incomprehensible to most people. I am talking about people who cannot afford shoes, who cannot buy soap, who can barely eat enough to live. When Olivia and I have given cheese sandwiches to beggar children at Giza, we have been horrified at the savage animal ferocity with which they crammed them into their mouths, not even chewing as they desperately gulped, with wild, staring eyes, anxiously worried that another child would try to grab a crumb from their very lips. In such a society, the possession of the secret of a single stone blocking an entrance to a single passage can mean the difference for an entire family between gnawing hunger and desperation and a feeling that life is worth living.

Apart from the rump tunnel and its upward annex to parts unknown, there are other Sphinx passages and entrances. Figures 1.36 and 1.37 are photos of the location of the entrance to a passage at the base of the Sphinx on its north side. The modern masonry was put there by Baraize, who walled up the passage in 1926. This one has not been unblocked, and we have absolutely no record of how far it extended, whether it went up or down, or anything at all other than the fact that two men could stand inside, as there is a surviving photo in the possession of the archaeological authorities showing a workman inside it in 1926 before it was closed. Hawass and Lehner speak of this passage as follows:



Figure 1.36 This is the entrance to a tunnel entering the northern side of the Sphinx, which was blocked in 1926 by Baraize using stones that he found in the vicinity. No one has any idea what is inside. It would be an easy matter to pull out these stones and see what lies behind them. The height of this doorway can be judged from the photo in figure 1.37 below. This photo shows the full width. The exploration of this Sphinx tunnel should be a matter of the highest priority. (Photo by Robert Temple)



Figure 1.37 Olivia Temple stands against the modern blocks that seal the tunnel opening in the northern flank of the Sphinx. This tunnel was opened in 1926 by Baraize, who then sealed it again firmly with these cemented blocks. He did not bother to leave an account of what he found. No one has opened it since. This large and obvious opening clearly led into the interior of the Sphinx's body, but no one ever bothers to wonder what it led to or why. (Photo by Robert Temple)

Several of the Archive Lacau photographs that document the excavations of the Sphinx during 1926–1928 show another spot where it appears that there might be a passage cut in and under the Sphinx. Arch. Lacau photos CI 17–20 show the north flank of the Sphinx when Baraize cleared the debris down to the floor level in 1925. The workers found a large number of Phase I–sized blocks toppled about in the debris at the base. CI 19 shows a close view of the base of the north belly where they found a large gap in the Phase I casing. A man is standing below the floor level in what may be a niche cut into the bedrock core body; another man stands on a small mound of sand just outside the gap. We identified this same spot on the basis of fissures showing in the core body above the casing. It is sealed off now by large stones, some of which are replaced Phase I slabs, sealed with grey cement [which is what Baraize used]. . . . It is possible that the passage in the north side of the Sphinx, like that at the rump, is ancient.<sup>16</sup>

It is interesting that this passage too had been covered by the early Phase I blocks, some of which Baraize put back in place and cemented, since this indicates an early date for this feature as well. The sealing of this passage has been accomplished so solidly that a major effort would have to be made to reopen it, and a decision was obviously made not to do so. Perhaps the passage will be reopened one day, especially in light of the information from the 1715 source, and the others to be discussed later, that there must be a chamber somewhere under the Sphinx, and any of the known passage entrances is a candidate for leading to it.

I tried very hard to locate the Lacau Archive photos mentioned by Hawass and Lehner, and it was with the greatest difficulty that I finally discovered where they were in Paris, in an obscure outlying facility of the Institut des Hautes Écoles called the Centre Golenischeff, which has a small Egyptological library. I made an appointment by telephone to go and see them, but when Olivia and I turned up at the library in Paris, we were refused access to the photos. We saw a door marked Archive in the library, but



the girl would not admit us to it, although she let us look at books on the open shelves. She said her boss, Professor Christiane Zivie-Coche, wanted to know why we wanted to see the photos. Zivie-Coche has written a brief book about the history of the Sphinx.<sup>17</sup> The girl said the photos were “in boxes,” but then most archive photos are in boxes! What else would they be in? The girl, Nathalie Toye, who was Zivie-Coche’s student and writing a thesis on New Kingdom stela prayers, gave me Zivie-Coche’s e-mail address and said I would have to write to her to explain why I wanted to see the Lacau photos. When I complained that I had come from London with an appointment, she showed no concern that it was a wasted trip and that the appointment mutually agreed in advance had not been honored. There were drunks, who had mattresses and slept beneath the library, shouting beneath the windows, making the atmosphere even less pleasant in that not exactly thrilling part of Paris called Glacière. The library was actually housed in a student residence building, and to get to it from the street, you had to step around overflowing rubbish bins that stank. I sent an e-mail to Zivie-Coche when I returned to London, and she replied by e-mail dated 21 September 2007 refusing me access to the Lacau photos on the excuse that they were in boxes, but then going on to make clear that her real reason was that “we do not share the same way in analyzing the egyptological [sic] questions.” She added: “I do not doubt that you worked on the question of the Great Sphinx so did I and so did Mark Lehner who is a [sic] excellent scholar and archaeologist with whom I worked on the spot.” In other words, access to the Lacau photos was to be restricted to Lehner, Hawass, and Zivie-Coche, and to those who agree with or sympathize with them. My reply to her was as follows:

Dear Madame, I am very disturbed by your email of 21 September. I am certain that Pierre Lacau would not have approved of your restricting access to his photos only to people who share your opinions. The Institut des Hautes Écoles would certainly not be in agreement with restricting public materials to private purposes. There is something called the community of scholars. Members of that community are meant to share information, not conceal it, especially information which was not originated by them.

No further reply was received. So, alas, I was unable to see the three Lacau photos showing the north side of the Sphinx during Baraize’s excavations. Zivie-Coche, on the other hand, did not hesitate to reproduce seven of the Lacau photos in her own small book on the Sphinx, none of them with any copyright indicated, so they are all clearly in the public domain. The Lacau photos are therefore readily available for use by Zivie-Coche herself, but cannot even be looked at by anyone who “does not share the same way,” to use her words, which presumably includes her theory recorded in her book: “I shall content myself with stating that the Sphinx was modeled as a gigantic image of Chephren.”<sup>18</sup> As we shall see in chapter 4, the face of the Sphinx does not look anything like the face of Chephren (see figure 4 7) and is most definitely not “a gigantic image of Chephren.” In chapter 4 I reveal which pharaoh’s face it really is. Zivie-Coche and I therefore certainly do not “share the same way.” Whether Zivie-Coche has abused her academic position by giving access to photos that are under her control to herself and her friends while denying access to those who disagree with her theories is for others to decide.

Hawass and Lehner also point out that there are old photos of 1925 (doubtless further Lacau photos, though they do not specify this, and Zivie-Coche’s refusal to allow me access to them means that I cannot check) showing evidence of “another large gap” near the base of the Sphinx masonry inside the large masonry box on the south side of the Sphinx. This may have been an opening to yet another Sphinx passage, but nobody can be sure today, for, as they say: “By the time of our work at the Sphinx in 1979, the gap was closed by limestone patching with modern mortar.”<sup>19</sup> Baraize and his cement again! Indeed,

one is tempted to view Baraize as a truly manic passage-sealer.

Hawass and Lehner do not mention the small underground chamber in front of the Sphinx, in which it is possible to crouch, and which is also sealed up, so we do not know whether it once led anywhere either. This little cell is now covered with a modern grille, and it is easy for anyone to see when you visit the paws of the Sphinx. The entrance hole to this cell is seen in figure 1.29. So what with all of these passages and entrances that lead nowhere today, one could be forgiven for being somewhat bewildered.

This brings us to the subject of the accessibility of the Sphinx and at what dates it was or was not covered by sand. In other words, if people were routinely entering a chamber beneath the rump of the Sphinx as reported in 1715, how were they doing this if there was too much sand to permit their reaching the base?

Other old photos of the Sphinx from my large collection, which are reproduced as figures 1.31 to 1.34 also clearly show the exposed crack in the haunches at the rear through which entry to the passages could still have been possible prior to 1926.

This matter of the gap in the haunches is certainly an interesting conundrum. And it brings us back again to the question of the upward tunnel in the rump, for if that tunnel really does or did emerge at the top of the back, or if another similar tunnel did emerge, then the underground chamber was reached not from the bedrock level but from a tunnel going down through the Sphinx's body from its back, and thus theoretically accessible for most of the period of the Sphinx's existence. That local people informed Hawass of the existence of the rump tunnel is also suggestive: it clearly implies what I have said, that local guides kept as a trade secret the existence of that tunnel, its "den," and its associated upward tunnel. But how did they first learn of it? And what other such tunnels and chambers may not have been revealed to any archaeologist, contrary to the way this one was revealed to Hawass? If people were entering the underground chamber beneath the Sphinx prior to 1715, they were certainly paying some very good *baksheesh* to whoever had the secret of how to enter it.

What, then, of this matter of the sand covering the Sphinx? The fact is that we do not have reliable information about all the periods when the Sphinx has been freed or partially freed from sand. The first full and reliable accounts we have of this problem date from 1817, as I shall describe in a moment. The Sphinx was said to have been covered with sand to the level of the head in 1798 when the Napoleonic troops of France invaded Egypt. As is explained in the next chapter, there was actually a partial clearance before they arrived, a fact that was forgotten until I discovered the evidence of it in an unpublished manuscript source. It is normally assumed that the Sphinx had been untouched for centuries before the arrival of the French, and that is doubtless how the French would like the story to be told, because it enhances their glory, and the French are always very keen on *la gloire*. However, by bringing this correction to the historical record in the next chapter, I do not mean to disparage the achievements of the French. Napoleon sent a large group of scholars (known as the *savants*, or wise men) to Egypt with the troops, who spent many months carrying out detailed surveys and studies of all kinds, which were later published in Paris in a series of famous and massively illustrated volumes.<sup>20</sup> We know that they cleared some sand from the Sphinx, but apparently not much. Of this expedition, the British colonel Howard Vyse wrote in 1840: "The French are not supposed to have made any considerable excavations or discoveries about the Sphinx, which was opened by Mr. [Henry] Salt and M. [Captain Giovanni Battista] Caviglia in 1817; but it appears that when Dr. Whitman saw it [in 1801], some of the sand had been removed, as he describes the substructure, although he did not perceive the body of the image."<sup>21</sup>

In his book *Pyramid Facts and Fancies*, James Bonwick gives some information that makes the history of visibility of the Sphinx even more complicated. He has a short section about the Sphinx in

which he points out that more of the Sphinx was visible in 1705 than in 1877, and presumably also more than was visible to Napoleon's scholars in 1798: "The head only appears above the sand at present [1877]. A picture in *Harris's Voyages*, about 1705, gives far more of the head than can now be distinguished. The wings, as they are called, behind the ears [he means the hanging folds of the nemes headdress, which are known as "lappets"], are very distinct, as well as the eyes, ears, and chin."<sup>22</sup>

In figure 1.46 we reproduce this illustration (which Harris had republished in 1705) in its original form, as it appeared in the 1611 book by George Sandys, which describes Sandys's visit to Egypt in 1610. The full text of Sandys's account of the Sphinx is given along with other early travelers' descriptions in part 2. The men riding on asses toward the Sphinx with harquebuses (old-fashioned rifles) over their shoulders are Mameluke soldiers, sent to escort and protect the European visitors to Giza from the dangerous locals, who might attempt to rob them. At this time, no trace of the Sphinx's body was visible.

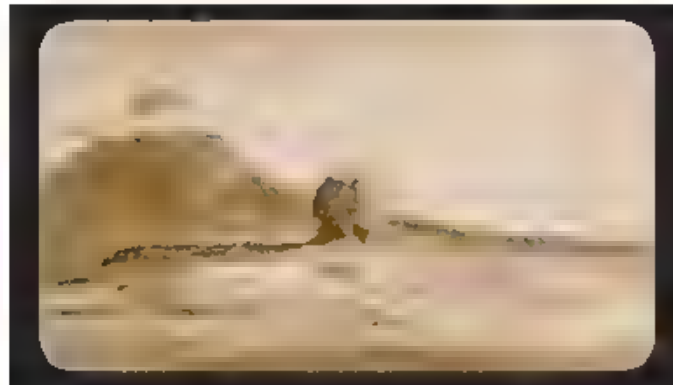


Figure 1.38. A nineteenth-century engraving by M. Kurz from a drawing done by A. Löffler showing the Sphinx largely buried in sand, which was prepared not for a book but as an engraving for separate sale in Germany at an unknown date. I purchased it from a German dealer, it is entitled "Sphinx und die Pyramiden." (Collection of Robert Temple)



Figure 1.39 The Sphinx in the middle of the nineteenth century, with only the desolate desert and sand dunes between it and the Pyramid of Chephren in the distance. The sand has already filled in again at the Sphinx's chest, following Caviglia's 1817 excavation of that area. The extreme erosion and poor condition of the left (north) side of the Sphinx is clear here. That has all now been covered over by "repairs." The great crack in front of the rump is seen here as a dark vertical streak in the side, as its top has been covered by windblown sand. The rear of the Sphinx, which was perfectly clear in 1827 (see figure 2.10), has now been swallowed by sand again. (Collection of Robert Temple)



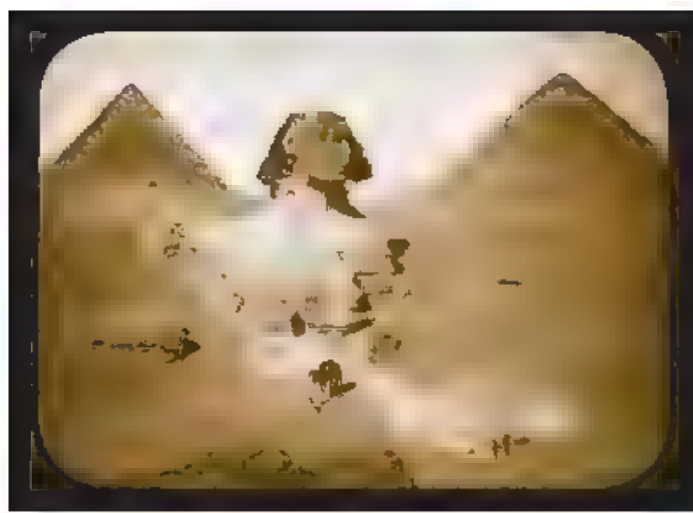


Figure 1.40. A Victorian photo of the Sphinx, showing the sand engulfing it on the north. In other Victorian photos the sand is engulfing it from the south. (*Collection of Robert Temple*)

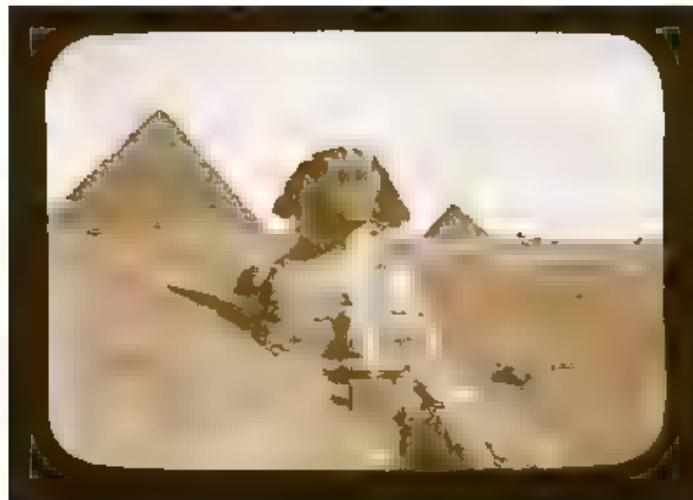


Figure 1.41. This old Victorian glass slide of the Sphinx shows that an ocean of sand has engulfed the south side of the Sphinx and that the mound on top of the Valley Temple has risen as high as the Sphinx's chin. After Caviglia cleared the space in front, this deluge of sand swallowed up the right leg again. (*Collection of Robert Temple*)



Figure 1.42. A Victorian glass slide, probably dating to the 1870s or 1880s, showing how the sand was reinvading the Sphinx after Caviglia's excavations. A man is sitting on top of the Sphinx's head and another stands on top of the Dream Stela. It is clear from this photo how impossible it was to get an idea of the north side of the Sphinx (at right) prior to its excavation by Baraize in 1926. (*Collection of Robert Temple*)



Figure 1.43. Here is a Victorian glass slide of the Sphinx taken from the northeast and showing the height of the sand to the north of the statue (*Collection of Robert Temple*)

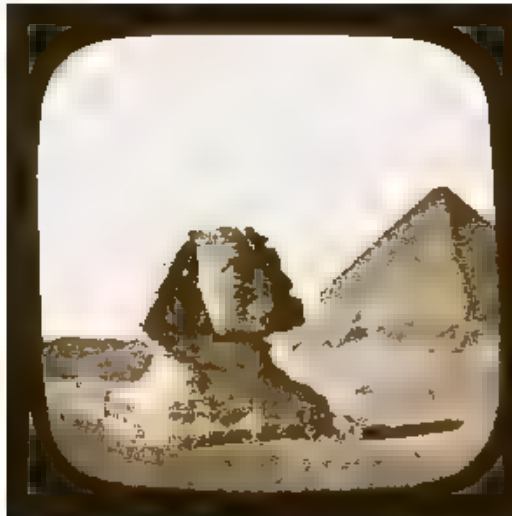


Figure 1.44. This glass lantern slide from the latter half of the nineteenth century shows what was visible and accessible of the Sphinx at that time. Most of the clearance at the front, done in 1817, has now filled in again with sand. The ragged nature of the left lappet of the headdress is very evident here, in silhouette against the sky. This photo gives a clear indication of the severe crack behind the Sphinx's shoulder, which is filled in today with cement. The more serious crack at the rump is just visible at the edge of the photo. (*Collection of Robert Temple*)



Figure 1.45. A Victorian glass slide of the Sphinx from the southeast, taken from the mound that still covered the Valley Temple. The Great Pyramid is in the background (*Collection of Robert Temple*)





Figure 1.46. This is how the Sphinx looked in 1610, just a head and neck sticking out of the sand (at left) This engraving appeared in the book by George Sandys, *A Relation of a Journey Begun An Dom 1610*, London, 1615. (Collection of Robert Temple, I am descended from George's uncle Myles Sandys )

Figure 1.47 is a contemporary drawing of the Sphinx as it appeared during Caviglia's perilous and daring excavations, when many of his men were threatened daily with being engulfed with sand. The Sphinx emerges from its surrounding element rather like a whale coming up for air. A description of Caviglia's immense feats makes for interesting reading:

He first began to open a deep trench on the left, or northern side, opposite the shoulder of the statue; and, though the sand was so loose, that the wind drove back frequently during the night more than half of what had been removed in the day, yet he managed by the aid of planks, arranged so as to support the sides, to dig down in a few days to the base. The trench, however, being no more than twenty feet across at the top, and not above three feet wide at the bottom, the workmen were evidently placed in a dangerous situation; for if any large body of sand had fallen in, it must have smothered those who were employed below. It was, therefore, found necessary to abandon this part of the attempt. By what had been done, however, the height of the statue from the top of the head to the base was ascertained, and it was also found that the external surface of the body was composed of stones of various sizes, put together with much care. The form of the masonry was not very regular, but it consisted of three successive ledges, sufficiently broad for a man to stand upon, to represent the folds of a mantle or dress. It seemed to have been added by the Romans.



Figure 1.47 This is Henry Salt's drawing of the Sphinx being excavated by Giambattista Caviglia in 1817. The most threatening mountain of sand was on the north side (to the right in this picture). In 1926, Baraize was so worried about the sand engulfing the monument from the north that he built the barrage walls seen in the aerial photo figure 6.50. It was not until 1937, 120 years after the scene here, that the problem of the sand to the north of the Sphinx was solved by Selim Hassan, with his armies of laborers and rail carts (see figures 3.11 and 3.12). This illustration is from *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Per-ring, 3 vols., London, 1842, appendix volume III, opposite page 107 (Collection of Robert Temple).

The result of the first operation not proving satisfactory, Captain Caviglia began a large excavation towards the front, in which he employed, from the beginning of March to the end of June, from sixty to a hundred labourers. Many interesting discoveries were now made. Among other fragments that were found, were portions of the beard of the Sphinx, and the head of a serpent. [This beard of the Sphinx was not original but was stuck on in the New Kingdom, as will be discussed later. These four fragments are seen in figure 3.1, as drawn at the time by Henry Salt. As for the serpent, this was the head of the royal uraeus emblem (insignia of a serpent rearing its head) on the Sphinx's forehead.] Most of these lay in a small temple, ten feet long and five feet broad, which was immediately below the chin of the statue. . . . A large part of the left paw was uncovered, and the platform of masonry was found to extend beyond it. In the course of a fortnight Captain Caviglia had removed the sand from the paw, and from the outer walls of the temple, in front of which was an altar formed of granite. It is now in the British Museum, and has had at the angles projecting stones, which may be supposed to have been called the horns of the altar. This fragment still retains the marks of fire—the effects, probably, of burnt offerings.

Captain Caviglia succeeded in laying open the base of the Sphinx, and in clearing away the sand in front of it, to the extent of more than a hundred feet. Many short Greek inscriptions were indistinctly cut on the paws of the statue. [These can no longer be seen, as the paws have modern masonry covering them as a result of restoration efforts. Later, we shall see that an inscription carved into the middle toe of the left paw contained some important evidence about the original purpose of the





[British consul general at the time, who worked with Caviglia]. On clearing away about the base of this statue, he had found steps that communicated with the gates of a little temple erected between the feet of the sphinx. An unpardonable egotism led him to block up again objects which call for an active and vigorous investigation, which would throw great light on the history of the arts in ancient days, would bestow *éclat* on one of the most sublime monumental fictions to be found in ancient Egypt.<sup>24</sup>

This is a shocking eyewitness report that Henry Salt, through obstinacy and egotism, “block[ed] up” things at the Sphinx that should have been the subject of “an active and vigorous investigation.” What does “block[ed] up” mean? It can only refer to openings and passages, and since the plural is clearly used, he must have done this to more than one. We are talking here of blockages made more than a century before Baraize. One of them certainly must be the blocked passage in the small underground chamber now covered with a metal grille beneath the face of the Sphinx. Since Count de Forbin is so adamant about it, we must presume that there was indeed an actual passage here that led away in some direction or other, which to us is unknown. Count de Forbin must have had an argument with Salt about it, insisting that someone should crawl along the passage and see where it went, but Salt couldn’t be bothered and “dealt with the situation” in the manner of a diplomat, simply by sealing the damned thing off and settling the matter by brute force, a tactic of “block-and-run.”

But as one of the blocked entrances may be identified, what could be another? Possibly Count de Forbin is referring to the one on the north side of the Sphinx that Baraize cemented over in the 1920s; Baraize may have opened it, had a look, and then resealed it as he did the rump tunnel. Or there may well be at least one completely different passage, of which we have no idea, or possibly several.

The blocked passage beneath the Sphinx’s head is probably the answer to how the oracles were given by the Sphinx. The voice didn’t actually come out of the head or mouth of the Sphinx, which was too high up to be heard easily, but out of the tiny chamber beneath the mouth at ground level, suitably obscured by a screen or even a cloth. The surviving little chamber is too cramped for a priest to crouch in for long, so he must have entered from the tunnel that Salt sealed up. But where was the entrance to this tunnel? Quite possibly it led from the northern side entrance sealed up by Baraize.

I have so far found one piece of evidence from an early traveler of the seventeenth century specifically mentioning a tunnel beneath the face of the Sphinx. There are many early travelers’ reports, which we shall consider later on, that relate the local people’s tradition that a tunnel led from the Sphinx to the Great Pyramid. But only one of these gives the additional detail that the tunnel of which this was claimed was, as the traveler puts it, “under the neck”:

The upper part [of the Sphinx] remains above the sand; the lower part, on the contrary, is entirely covered. If it be true that the rest, or the lower part, is proportionate in size to the upper part, one must consider that it is one of the Seven Wonders of the World, for it seems to be cut from one piece of stone. Some people ask themselves if this stone colossus was cut from a natural rock in situ, or if it had been carried here from elsewhere. Plenty of people have wanted to examine it by excavation but they could not because of the sand. Others thought that this monster consisted of nothing more than half a body, for under the neck there is an opening of a stone tunnel which passes across the mountain of sand up to the pyramids, where it ends.<sup>25</sup>

This evidence from Father Antonius Gonzales, who visited the Sphinx in 1665, is highly specific. We need not accept the story that the tunnel went as far as the pyramids, but we must accept the likelihood that there was indeed an opening of a tunnel “under the neck” of the Sphinx, and this most probably is one of

the things blocked up by Henry Salt that so enraged Count de Forbin.

At the very least, in light of this evidence, the blocked passage in the tiny chamber beneath the face of the Sphinx should be opened. This should not be very difficult. Salt is unlikely to have had the resources that Baraize had to enable him to pour vast quantities of cement into the Sphinx. Salt's blockage would probably be easy to unblock. And if this is ever done, we can thank Count de Forbin for the prompting that led us to rediscover whatever it is that may be found. Even if the passage leads only a short distance, it could provide the answer as to how the oracles were delivered at the Sphinx.

The clearance by Caviglia and Salt did not last long. A mere seventeen to eighteen years later, on December 31, 1835, the Sphinx was visited by John Lloyd Stephens, who recounted: "Next to the pyramids, probably as old, and hardly inferior in interest, is the celebrated Sphinx. Notwithstanding the great labors of Caviglia, it is now so covered with sand that it is difficult to realize the bulk of this gigantic monument. Its head, neck, shoulders, and breast are still uncovered; its face, though worn and broken, is mild, amiable, and intelligent, seeming, among the tombs around it, like a divinity guarding the dead."<sup>26</sup>

It is often difficult to construct a reliable picture of what portions of the Sphinx were exposed or accessible at which dates. Just as one thinks one knows what the status was at a certain period, an unexpected piece of evidence comes to light that gives one a shock. For instance, I had assumed that during the period when Napoleon's expedition was in Egypt commencing in 1798, the Sphinx was covered in sand up to its shoulders and nothing else was visible. However, I then unexpectedly came across a passing remark that stated that the French at that period had cleared only the back of the Sphinx. But I had not known that they had done that, and I don't believe anyone else today had realized it either. I found this in an anonymous article in the *Quarterly Review* for 1818: "The Arabs . . . told to Mr. Caviglia, that the French had discovered a door in the breast of the Sphinx, which opened into its body, and passed through it to the second pyramid The French never uncovered more than the back of the Sphinx."<sup>27</sup>

While still surprised at this, I then came across another account, published eight years earlier, which gave the French credit for doing much more:

Upon the south-east side [of the Great Pyramid] is the gigantic statue of the Sphinx, the most colossal piece of sculpture which remains of all the works executed by the Antients. The French have uncovered all the pedestal of this statue, and all the cumbent [i.e., recumbent] or leonine parts of the figure; these were before entirely concealed by sand. Instead, however, of answering the expectations raised concerning the work upon which it was supposed to rest, the pedestal proves to be a wretched structure of brick-work, and small pieces of stone, put together like the most insignificant piece of modern masonry, and wholly out of character, both with respect to the prodigious labour bestowed upon the statue itself, and the gigantic appearance of the surrounding objects.<sup>28</sup>

This even more unexpected discovery appears to lead us to the conclusion that the French in about 1798/1799 may possibly have cleared the Sphinx entirely, and that less than two decades later it was all covered up again practically to the neck, so that in 1817 Caviglia had to clear the whole thing again. Although this at first seems unlikely, when we remember that Stephens tells us that less than two decades after Caviglia, the sand was back and the Sphinx was once more covered up to its shoulders, we see that the process merely repeated itself in the same length of time. It must have been an era of high winds!

In fact, the French clearing of the Sphinx must have been an incompetent effort, because a report by



William Hamilton proves that the sand had blown back again within a period of between three and ten years. The French clearance of the monument was in 1798 or 1799, and William Hamilton first visited Egypt in 1801, the year the French left. His book *Aegyptiaca* was published in London in 1809, so it cannot describe anything later than 1808. Here is what he says in his book: "The French excavated the body of the lion; which they found uninjured: but the sands of the Desert very soon rendered their labour vain, and the last time I saw the sphinx, the head and neck alone were visible. These have been evidently painted all over, and many characters are to be traced upon the head-dress [*which are all gone today*]." <sup>29</sup>

It is important to try to figure out how much of the Sphinx was exposed at any given time when we evaluate the meaning of various travelers' reports about doorways and passages. If anyone says he saw a chamber, could he really have done so? Was there anything sufficiently exposed to enable him to have access to any chamber?

By going through the early reports, I have now found a sufficient number of accounts tallying with one another to put together a proper case, and we shall be considering it in detail as we progress. We will see clearly that we are not left relying upon a single account that may be either unreliable or a mere fantasy. Various patterns emerge in the accounts when one compares them. And these in turn can sometimes even be supplemented by genuinely ancient evidence. To give a single example of this, let us consider whether there is any ancient account that suggests that there might be a "door" or entrance in or near the Sphinx leading underground. As it happens, there is. This ancient text is cited by the famous excavator of the Sphinx, Dr. Selim Hassan. It comes from the *Book of the Dead*. At the time those funerary texts were written, the Sphinx was called Ruti. In chapter 41, line 2, we read. "O Atum, I was rendered shining before Ruti, the Great God, who opens the door of Geb." <sup>30</sup>

Geb is the god of the Earth. Consequently, we have here a genuinely ancient text that speaks of the Sphinx opening the door of the Earth.

In his translation of the *Book of the Dead*, Renouf does not use the proper name Ruti, but uses the word in its meaning of "lion"; he also gives the name of the Earth god in its variant form of Seb and Atum in its variant form of Tmu: "O Tmu, let me be glorified in presence of the god in Lion form, the great god; that he may open to me the gate of Seb." <sup>31</sup>

Sir Wallis Budge, in his translation of the text, also does not use the name Ruti, but in his case he assumes that Ruti is a "double-lion god," because of the old pictures showing a kind of double-lion facing each way (see figure 1.49 below), also known by the name of Aker, the double-form being known as the Akeru (which is plural). Budge also uses Seb instead of Geb and Tem instead of Atum: "Hail, Tem, I have become glorious (or a *Khu*) in the presence of the double Lion-god, the great god, therefore open thou unto me the gate of the god Seb. I smell the earth. . . I advance into the presence of the company of the gods who dwell with the beings who are in the underworld." <sup>32</sup>

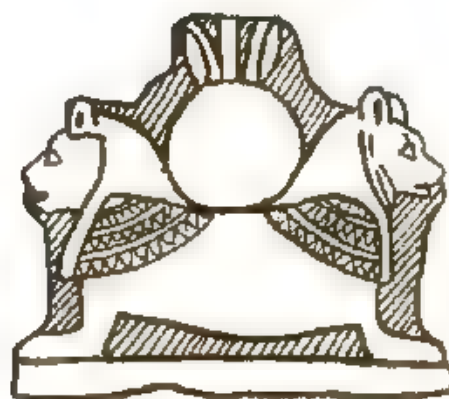


Figure 1.49. The double-headed lion facing both ways—symbol of the netherworld, which one enters by the eastern mouth as a corpse and leaves from the western mouth as a glorified spirit, called in Egyptian an *akh*, if one is lucky! (Many are the decapitated spirits of the damned that rumble forever in the stomach of this, the Earth Lion, screaming in agony as demons torment them in unspeakably vile ways.) This drawing comes from Selim Hassan's *Le Sphinx*, Cairo, 1951.



Figure 1.50 The Sphinx and the Pyramid of Chephren silhouetted at sunset, a view not seen by the public for a generation, as the Giza Plateau is locked long before this hour (Photo by Robert Temple)

So we see that this passage clearly refers to a door of the Earth god that leads into the underworld and that appears to be at the Sphinx. It is certainly suggestive, and in the following chapters we shall have plenty of opportunity to see just how much it may mean.

## THE “SECRET CHAMBER” BENEATH THE SPHINX

The “secret chamber” beneath the Sphinx is not secret at all. It was known about for centuries, but forgotten in our own time. It was last described in print in 1953. Countless subsequent speculations about secret chambers beneath the Sphinx, and a book on the subject that was actually entitled *Secret Chamber*, have all been published without anyone having any recollection or knowledge of the many accounts of the *real* secret chamber that have appeared in print since 1672. Published accounts of the chamber beneath the Sphinx appeared several times during the 281 years that elapsed from the first to the last mention of it.

It certainly doesn’t look very good that people have written so much about this subject without knowing anything about the plentiful evidence!

We shall see that the location and measurements of the shaft are known, along with the existence of an apparent burial chamber, which was entered by several people. But no one today who claims to be an expert on the Sphinx knows anything about it. Published reports on the subject that appeared over the course of more than two and a half centuries have therefore remained unknown, as if they had never been published.

I must make it clear that we are not here referring to the rump tunnel and the hollow in the rock at the bottom of it, all of which I have discussed at length in the first chapter. We are now considering instead the vertical shaft that was driven down into the Sphinx at about the point where the hips join the body—a shaft wholly filled with cement by Baraize in 1926, as I described in the previous chapter.

The first person to describe the shaft and burial chamber was the German traveler Johann Wansleben, often called Father Vansleb by the French and the English because the letter *W* in German is pronounced like a *V*. Sometimes his name has been misprinted *Vausleb*. A partial English translation of his account was published in London in 1678, with the title *The Present State of Egypt* (I reproduce in figure 2.1 the title page of my own copy of the 1678 English edition of this book, where the author is called “F. Vansleb,” the “F.” standing for “Father.” I also reproduce as figure 2.2 the relevant page of his book that contains his comments on the Sphinx.) I have also translated Wansleben’s original account from German, as we shall see. The shaft and the chamber were next visited by an Englishman from Devonshire named Ellis Veryard in 1678, presumably stimulated by Wansleben’s book, and Veryard then published his own account twenty-three years later, in 1701. In 1715, the anonymous translator of Pancirollo mentioned the subject in the book that was described in chapter 1. His description was lifted directly from Wansleben’s book, as may be seen by a comparison of the wording. In 1721, the Englishman Thomas Shaw visited the Sphinx and mentioned the shaft and chamber in his published account in 1738. Five years before Shaw’s book was published, in 1733, Charles Thompson visited the Sphinx and mentioned the shaft and chamber



in his book of 1754. Meanwhile, in 1743, ten years after Thompson's visit but eleven years before his account was published, Richard Pococke described the shaft and chamber. They were mentioned again in 1757 by the Dane Friderik Norden. The entrance to the shaft then became inaccessible due to sand covering most of the back of the Sphinx, as Coutelle tells us in 1798. (Windblown sand covering the back of the Sphinx is clearly seen in figure 1.46.) But in the nineteenth century it was cleared first by Caviglia, whom we have already encountered. He entered and mapped the subterranean chambers, and then they were studied again by the archaeologist Auguste Mariette, whose account was published in 1855 (a translation of which may be found in appendix 1). Ludwig Borchardt mentioned the shaft and chamber in 1897 (in his pamphlet "On the Age of the Sphinx at Giza," translated here in its entirety, in appendix 2). And finally, Selim Hassan, excavator of the Sphinx, mentioned them again in his book of 1953. Incredibly, every one of these accounts has been overlooked until now. This shows that the state of scholarship in the Egyptological field has fallen to a very low level indeed—so perilously low, in fact, that it calls into question almost any assertion made today about anything in the entire field. The day of the Egyptological scholar appears to be gone. One of the problems is that professionals are too narrowly educated today, and too narrow also in their professional activities. Many of them would like to display wider interests, but they are cowed and intimidated by peer pressure into confining themselves to small areas of expertise. Anyone who dares to go against this bullying and "political correctness" run amok risks his or her career. So they keep their heads down and do not dare to challenge the Monitors of Narrowness. Thus, the public cannot obtain enlightenment, and a vacuum is created into which all sorts of "outsiders" enter. Then the Egyptologists complain because things are being written by "outsiders." But the Egyptologists themselves are largely to blame, by failing in their duties of communicating with the public themselves.

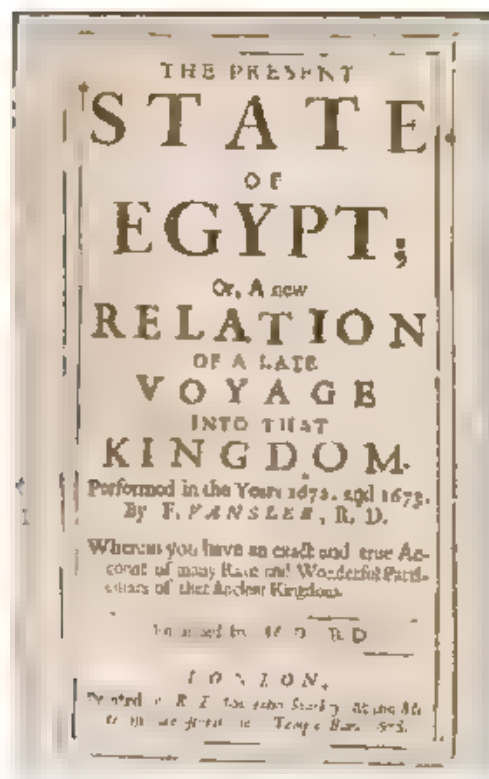


Figure 2.1 This is the title page of the English translation published in 1678 of the book by "Father Vansleb," the German traveler Johann Wansleben. Wansleben visited Egypt twice, in 1664 and again in 1672. This translation does not contain all that he wrote, so I have translated further sections from the German original. The page of this translation discussing the Sphinx is also reproduced here, as figure 2.2. Wansleben describes seeing the chamber beneath the rear portion of the Sphinx, writing that it was of the same dimensions as the Sphinx's head. (*Collection of Robert Temple*)

Anyone who has the intention of seriously discussing the Sphinx should as a first step collect all the

existing textual evidence about the Sphinx that can be found. Sensing that it was my duty to find out what others had said about the Sphinx before I myself had the temerity to say anything at any length, I spent many months gathering all the reports of the Sphinx I could find. And I did this first, before I started writing what I myself might think. Many of the reports I found were in foreign languages, of course, so I translated or had translated every one that was not in English. My wife, Olivia, translated those that were in French, I translated the ones that were in German (and some other German material was later translated with my colleague Eleonore Reed), and a friend translated one from the Dutch. The two in Latin were already published in English, and the Arabic ones that I was able to find were already published either in French or English translations. Doubtless I have missed some other Arabic texts, but I cannot read that language, and alas, this is one of my many failings and weaknesses. The Arabs are underrepresented, but with all their oil money, they ought to do more to make their own literature available to us infidels.

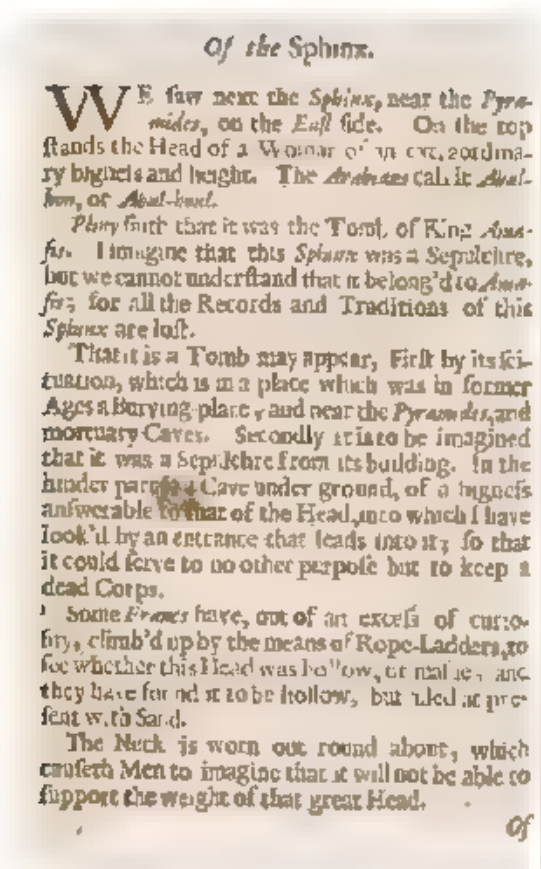


Figure 2 2 The page from the book by "Vansleb" (Wansleben) describing the Sphinx and the chamber beneath (*Collection of Robert Temple*)

The result of these labors of mine and Olivia's was nearly sixty typed pages of descriptions of the Sphinx from the earliest times (Roman) until 1837 (see part 2 of this book), when we stopped trying to be comprehensive. These are very intriguing descriptions, and they reveal much.

Part 2 is intended as a standard reference source for everyone interested in the Sphinx in the future. There will be no need for anyone researching the Sphinx to go to libraries and dig it all out and translate it, as we have already done that for them. Also, anyone reading this book who wants to check a reference has only to turn a few pages, rather than plan a visit to a major international library.



Figure 2.3. A reconstruction of how the Giza Plateau would have looked in the reign of the pharaoh Chephren (Khafre) of the Fourth Dynasty, as envisaged in 1912. This drawing was published as the frontispiece to *Das Grabdenkmal des Königs Chephren (The Funerary Monument of King Chephren)*, by Uvo Hölscher, Leipzig, 1912. The reconstruction was done by Hölscher and the artwork by Hölscher and A. Bollacher. The rectangular structure beside the Sphinx is the building that we now call the Valley Temple. It is linked by a covered causeway to the Pyramid of Chephren. The Great Pyramid is in the background, surrounded by many tombs of officials. What is missing from this reconstruction is the Sphinx Temple, situated directly in front of the Sphinx, which at this date was still entirely unknown because it was buried in a mound of sand. Instead, the area in front of the Sphinx in this view is shown simply as a flat expanse of sand. The Sphinx Pit, which had not yet been excavated, was not understood at this time either. Instead, in this view, the area to the left of the Sphinx is not bounded, but is open. Consequently, the vicinity of the Sphinx as shown here is falsely depicted. We now know that there was also a causeway in front of the Great Pyramid, but it is not depicted here at all. One interesting feature of this view is the distant hill on the horizon, with two pyramids sticking up on top of it. This is the site called Abu Ruash. In fact, there is no conclusive evidence that any pyramid was ever fully constructed on that hill, much less two, though there is a gigantic hole in the ground on that hill that looks like the descending passage and chamber of what might have become a huge pyramid, if it had been finished. (Or it may have had another purpose, no one really knows.) It was at Abu Ruash that the small limestone female sphinx was found (see figures 4.3 to 4.6). It is a pity that more reconstruction drawings like this are not produced today, because even when they are wildly inaccurate, as this one is, they do give a vivid impression of the magnitude and grandeur of the Giza concept and help us visualize something of the general appearance of what ancient Egyptian monuments would have looked like when they were not ruins. As for the depiction of the Sphinx here, it is entirely incorrect and out of proportion. The body has been given a muscular, leonine form, and a gigantic head has been placed on the body, which the real Sphinx does not possess. When we look at the details of this picture, almost everything is wrong. But when we glimpse the totality, it still conveys an impression to us of the greatness of the Old Kingdom and its monuments.





In the next chapter, I discuss one incredible piece of information recorded about the Sphinx in 1482, which I point out must have survived as folklore for approximately seventy-five generations—clearly a world record! There is no other explanation for that particular instance. But it does not relate to a chamber under the Sphinx, so it is left until later.

It is always simplest, and often best, to survey a series of descriptions chronologically as they occur. So this is what we shall do. The earliest apparent description of a shaft and chamber beneath the Sphinx that I found came from the seventeenth-century German traveler Johann Wansleben, so we will start with him. He actually visited Egypt twice, in 1664 and again in 1672. He wrote accounts of both journeys, but only the account of the second journey was translated and published in English, in 1678 under the title *The Present State of Egypt*.<sup>1</sup> Both of Wansleben's accounts were published together in German in 1794, and I have made my own translations from the two accounts in that edition.<sup>2</sup> First let us see what Wansleben wrote about the Sphinx in 1664, which does not mention any shaft or chamber:

## **Chapter 2. Concerning Abul-Haula, or the Sphinx**

Near to the first pyramid, and below it, stands in the ground Abulhoula, or the Sphinx, as the French call it. It is an uncovered head and neck skillfully put together from stone; it is not hollow, but solid, and is 26 feet [Fuss] tall, as the Dutch Consul Johann Thyls has measured it. Nothing more protrudes above the earth; what is under the sand, I cannot say. The nose of the Sphinx has been chopped off and the moors tell a polite fiction about how that happened, which for the sake of brevity I omit.<sup>3</sup>

Now we shall see what Wansleben wrote about the Sphinx in 1672, when he studied it more closely, first taken from the English translation published in 1678, and then my own translation of the German original. Here is the version of the translation that was published in 1678:

We saw next the Sphinx, near the Pyramids, on the East-side. On the top stands the Head of a Woman of an extraordinary bigness and height. The Arabians call it Abul-hou, or Abul-houl.

Pliny saith that it was the Tomb of King Amasis. I imagine that this Sphinx was a Sepulchre, but we cannot understand that it belong'd to Amasis; for all the Records and Traditions of this Sphinx are

lost.

That it is a Tomb may appear [old-fashioned way of saying “may be seen from the facts that”], First by its situation, which is in a place which was in former Ages a Burying-place; and near the Pyramides, and mortuary Caves. Secondly, it is to be imagined that it was a Sepulchre from its building [oldfashioned way of saying “its form”]. In the higher part [evidently the seventeenth-century publisher’s error for “hinder part,” the original German word being *hinterwärts*, which means “hinder part” or “rear part”] is a Cave under ground, of a bigness answerable to [old-fashioned way of saying “equivalent to”] that of the Head, into which I have look’d by an entrance that leads into it; so that it could serve no other purpose but to keep a dead Corps

Some Francs [Frenchmen] have, out of an excess of curiosity, climb’d up by means of Rope-Ladders, to see whether this Head was hollow, or massie [solid]; and they have found it to be hollow, but filled at present with Sand.

The Neck is worn out round about, which causeth Men to imagine that it will not be able to support the weight of that great Head.<sup>4</sup>

It is important to note that the account of what the Frenchmen found on top of the head is recorded as hearsay, and is not Wansleben’s eyewitness account. And we know that although there is a hole in the head, it is only a narrow drilled one that goes down a few feet, and was at that time filled with sand, so people thought it led to more than it did.

The original German text has one additional sentence that was not translated in the English edition, which merely says: “One can find the measurements of the Sphinx in Thévenot.” This is a reference to Jean de Thévenot, who visited Egypt in 1655 and published a lengthy account of his travels in French in 1664–84, which was translated and published in English in 1687.<sup>5</sup>

I have translated the portion of Wansleben’s second account more accurately, and here is the section that relates to the shaft and chamber: “It has a cavity under the ground there rearwards [*hinterwärts*], the width of which measures the same as the height of the head [which is 26 feet according to his 1664 account], into which I looked from an opening into it, and which can have served no other purpose than to have the corpse of a dead person put into it.”<sup>6</sup>

If it were not for the existence of the many subsequent accounts, we might be inclined to assume that this description is somehow a confused account of looking down into the hollow at the bottom of the rump tunnel. But we must remember that the base of the back of the Sphinx was covered by sand at this time. So the reference must unquestionably be to something that Wansleben saw by descending into the shaft at the beginning of the Sphinx’s hips. And although, as we have seen in the first chapter, he might have been able to crawl around to the rump tunnel from there, the hollow at the end of the rump tunnel is not of the size that Wansleben describes, nor is it large enough to have contained a corpse. Wansleben thus seems to have seen a different cavity beneath the Sphinx, which was considerably larger. And to confirm this, we must consider the subsequent accounts, which make the matter much clearer.

To understand how Wansleben was able to have such access to the Sphinx in 1672, it is useful to note what was stated about the sand level by a traveler who visited the Sphinx in 1614, Pietro della Valle. His testimony makes clear that in the seventeenth century, the sand level was not quite as high as we might have imagined. Although Wansleben says that only the head and neck protruded from the sand, more of the neck was probably visible, and hence more of the back, than we are used to seeing in the nineteenth-century photos of the head and neck protruding from the sand. According to Pietro della Valle, in 1614:



"The country round there is very level and sandy, and the sand has increased in such a way that the Sphinx is buried there almost up to its shoulders."<sup>7</sup> We must thus probably understand Wansleben's "head and neck" as meaning that the tops of the shoulders were also visible, and that with such a sand level, more of the back was exposed than was the case in Victorian times.

Six years after the second visit to the Sphinx by Wansleben, and in the same year that Wansleben's account was published in English (1678), the Englishman Ellis Veryard, a medical doctor from Colyton in Devon, doubtless with a freshly printed copy of the Wansleben book in his eager hand, visited the Sphinx and saw the shaft and the chamber. But he did not actually publish his account until long afterward, in 1701. So what happened next in the chain of publications was something quite different. A bizarre book appeared in Dutch that purported to be by an Englishman named Edward Melton, who was said to have visited Egypt and the Sphinx in 1661, before Wansleben's first visit. For a long time I was puzzled by this book, in which the author is described specifically as "an English nobleman." I made extensive efforts to trace an Edward Melton, and even consulted a seventeenth-century manuscript pedigree of the Melton family in the British Library (MS. Egerton 3402, f. 119 verso), but there was no Edward mentioned anywhere in it.

The book by "Melton" was first published at Amsterdam in 1681 and was so successful that it was reprinted in 1702.<sup>8</sup> Strangely, for a book so successful in Dutch and supposedly written in English by an "English nobleman," no English edition ever appeared. After I had obtained a translation of the relevant passage from Dutch and could compare it to Wansleben's text, I realized that it was largely a paraphrase of Wansleben and Thévenot combined. It could not have been an original account by "Melton" as was claimed, because the very phrases themselves were copied from others. And when there were changes, they were apparently fraudulent, such as "Melton" claiming that he had climbed up on top of the Sphinx's head himself, in the way that Wansleben had said the Frenchmen had done. "Melton" refers to no shaft, but says the Sphinx sits above a basement which "has an entrance. This basement was without doubt used to bury the bodies of dead men."<sup>9</sup>

There seems little point in giving the full text from "Melton," as I became convinced that he never existed, and that the work and the author are equally spurious. Strangely, the existence of Melton has been uncritically accepted by several well-known Egyptologists over the years, not because they were interested in what he had to say about the Sphinx (there being no evidence that they ever read that bit), but because they were searching for early accounts of the two stone pyramids at Dashur, one of which is called the Red Pyramid and the other the Bent Pyramid because it changes the angle of its exterior slope in a very dramatic way. Those authors included Howard Vyse, Ahmed Fakhry, and Dietrich Wildung. However, a survey of the situation was published as an article by Kathleen M. Pickavance in *The Journal of Egyptian Archaeology* in 1981 <sup>10</sup> In her article, Pickavance struggles with the problem of Melton. She adds the information, possibly spurious, that he was "Born c. 1635 the second son of Sir John Melton, Kt. of London," and he studied at Oxford. I doubt this. I own my own copy of *Athenae Oxoniensis*, which surveys all Oxford men who became authors before 1721, and the only Melton who appears in the entire giant folio volume is a William de Melton of Yorkshire who died in 1528 <sup>11</sup> Pickavance says of Melton's account of entering the Bent Pyramid at Dashur: "It is hardly to be believed. . . . The greatest obstacle to the belief that Melton entered the Bent Pyramid by the western entry rests in Perring's description of the state of the western passage as he had found it in 1837: 'The greater part of it was closed up with large blocks.' . . . We are then faced with the inconceivable possibility that the western passage was more or less open in 1661, and subsequently closed up again, with all the flush-fitting blocks in place, when Perring saw them in 1837. In fact, it is the archaeologists' findings which must surely prove that the belief

that travelers entered a chamber in the Bent Pyramid from the west is untenable, and that any account which even suggests such a possibility is either misleading, false, or a misinterpretation.” I would go so far as to say that the real reason why ‘Melton’ did not actually enter the Bent Pyramid as he claimed was that he did not really exist. The book attributed to him appears to have been a publishing hoax carried out for commercial motives. Some Dutchman must have pocketed a lot of money and laughed at the fools who were taken in by his tricks.

The next thing that happened in the succession of publications is that Ellis Veryard’s account of his journey to Egypt and other countries was finally published in 1701, twenty-three years after it had taken place.<sup>12</sup> Here is what he had to say about the Sphinx:

About half a Mile from the Pyramids we saw an ancient Colossus representing the Sphinx, with a Woman’s face, and the Body of a Beast. This Statue was in so great Veneration amongst the Egyptians heretofore, that they gave it the first place amongst their Gods, and received all their Oracles from it, which the Devil utter’d thro’ the Mouth of this artificial monster. The Body is buried in the Sand, and only the Head and Breast remain above Ground; so that we may judge of the vast bulk of the whole by the Face, which is twenty four foot long. [Wansleben had said 26 feet, so Veryard must have taken his own measurements] Pliny says it was the Tomb of King Amasis; but I am apt to think it was an Ornament placed on his Sepulchre; for behind it we found a Subterranean Vault cut out in the firm Rock, which in all likelihood was the Tomb.<sup>13</sup>

The phrasing is brief and vague, but as Veryard specifically says that he believed the Sphinx sat on *top of* the sepulchre, and then proceeds to say that the same sepulchre was “behind it,” we must presume that he means behind the protruding head rather than behind the entire Sphinx. If he had meant to refer to a burial in the rocks a considerable distance behind the entire Sphinx, in the cliffs of Giza, this would have been in contradiction to his affirmation that the sepulchre was *beneath* the Sphinx. He must therefore be referring to the same chamber mentioned by Wansleben, which was *hinterwärts*, or to the rear of, but not behind and away from, the Sphinx. And once again we have specific testimony that the sand was too high for this to be the hollow at the base of the rump tunnel, as the opening at the base of the Sphinx was inaccessible.

The next publication mentioning the chamber beneath the Sphinx was fourteen years later, in 1715, when the English translation of Pancirollo appeared, the anonymous translator of which added the information, as I have described in the previous chapter.<sup>14</sup> However, the unattributed description by the anonymous translator was something I eventually tracked down when I discovered Wansleben’s book, since the passage is taken directly from the 1678 English edition of Wansleben. And so that mystery, which had plagued me for many months, was solved. It was, after all, the Pancirollo book that I first encountered, and it was only by discovering the passage in it (which at first I assumed was translated from Pancirollo’s original Latin work, until, having gone through all of its successive editions from 1599, I realized it was really an interpolation by the English translator) that I realized I had to find its source, which led to my discovering all the other references to the “secret chamber,” and writing this chapter.

Here, then, is what the anonymous translator of Pancirollo inserted into Pancirollo’s book in English in 1715 and which was reprinted in 1727, repeated so that the succession of relevant quotations may be complete:

I imagine this Sphinx to be a Sepulchre, but we cannot understand how it belong’d to Amasis [the Greek name of a pharaoh whom he mentioned earlier, said by Pancirollo to have constructed the



Sphinx], for all the Records and Traditions of this Sphinx are lost. That it is a Tomb, may appear, 1. By its Situation, which is in a Place, which was in former Ages a Burying-Place, and near the Pyramids and mortuary Caves 2 It is to be imagin'd that it was a Sepulchre from its building. In the hinder Part is a Cave under Ground, of a Bigness answerable to [an eighteenth-century expression meaning "comparable to"] that of the Head, into which the curious have look'd, by an Entrance that leads into it; so that it could serve no other Purpose but to keep a dead Corps [corpse] in, as Travellers inform us.<sup>15</sup>

Notice that the translator specifically says this information comes from "travellers." So it is not a plagiarism in the style of "Melton." The question that I was confronted with for so long was: Who were the travelers? It is now clear that the travelers were Wansleben and Veryard. The text is more or less lifted directly from the English translation of Wansleben's book and adds nothing new. Mystery solved. But imagine how difficult it was to solve it, without any clues whatsoever and only a cutoff date of 1715 to go by. However, such are the perils of scholarship, and sometimes one succeeds, as I fortunately did here.

The next step along the road of published accounts about the Sphinx chamber came in 1721, when the famous English traveler Thomas Shaw visited Egypt. His account of his travels was published in 1738.<sup>16</sup> It is very well known, and ignorance of his comments on the shaft and chamber among Egyptologists is less excusable than it is for the preceding and highly obscure works that I have already cited.

Here, with Shaw, we finally get the specific and detailed information that we so greatly desire, frustrated as we have been with the vague and dreamy accounts of the previous visitors. For the satisfaction of readers, I shall give all of the comments on the Sphinx made by Shaw, commencing with some preliminary ones:

The catacombs of Sakara, the Sphinx, and the Chambers, that are cut out of the natural rock, on the east and west side of these pyramids, do all of them discover [i.e., display] the specific mark and characteristics of the pyramidal stones, and, as far as I could perceive, were not at all to be distinguished from them. The pyramidal stones, therefore, were, in all probability, taken from this neighbourhood; nay, perhaps they were those very stones, that had been dug away, to give the Sphinx, and the chambers I have mentioned, their proper views and elevations.<sup>17</sup>

A few pages later, Shaw returns to the Sphinx itself.

## Of The Sphinx

Besides what has been already said of the Sphinx, we are to observe, that in July 1721, the sands were so far raised and accumulated about it, that we could only discover the back of it; upon which, over the rump, there was a square hole, about four feet long, and two broad, so closely filled with sand, that we could not lay it open enough to observe, whether it had been originally contrived for the admission of fresh air; or, like the well in the great pyramid, was intended for a stair-case. Upon the head of it there is another hole, of a round figure; which, I was told, for we could not get up to it, is five or six feet deep, and wide enough to receive a well-grown person. The stone, which this part of the head consists of, seems, from the colour, to be adventitious, and different from the rest of the figure, which is all of the same stone, and hewn out of the natural rock. [This is a very sharp observation, for we now know that the head was carved from a stratum of stronger limestone than the body and is indeed harder and "different," quite apart from the fact that it seems to have been cut



down and recarved by a later pharaoh in his own image ] It must be left to future travellers to find out, whether these holes served only to transmit a succession of fresh air into the body of the sphinx, or whether they might not have had likewise a communication with the great pyramid, either by the well, or by the cavity or nich [niche] in the wall of the lower chamber [the Subterranean Chamber], that lies upon a level with it. Nay, it may some time appear, that there are chambers also in the two other pyramids [we now know this to be true]; and not only so, but that the eminence likewise, upon which they are both erected, is cut out into cryptae [crypts], narrow passages, and labyrinths, which may, all of them, communicate with the chambers of the priests, the artful contrivers of these adyta [*adyta* is plural of *adytum*, which means a restricted area at the back of a temple, reserved for the priests]; where their initiatory, as well as other mysterious rites and ceremonies, were to be carried on with the greater awe and solemnity.<sup>18</sup>

Here we have the first clear and detailed description of the entrance to the vertical shaft, together with careful measurements of its dimensions. Wansleben and Veryard had not bothered with such things. But in the forty-three years that had elapsed since the visit of Veryard, the shaft had become filled with sand again, so Shaw was unable to descend into the chamber below. The location of this carefully constructed entrance to a shaft confirms the information we have had from Wansleben and Veryard that it was at the rear of the Sphinx's body, associated with the haunches of the creature.

Anyone familiar with the way things have worked at Giza over the centuries, in terms of local families and their habit of earning their living from visiting foreigners' baksheesh, can well imagine what had transpired. Reading through all the travelers' reports over many centuries as I have done and as the reader may now do (since they are all collected and printed in this book), one finds a remarkable continuity of behavior on the part of the locals and their insatiable demands for baksheesh, as well as their devices for obtaining more. For instance, it is obvious that the local guides had measuring rods ready at hand for all the visitors, since they all make their own measurements of the Sphinx's head, and they cannot possibly all have come with their own rods! But trying to find a new angle to make more money in the middle of the seventeenth century, some enterprising man from the adjoining village now called Nazlett (but in Greek times known as Busiris, which is not to be confused with the other city called Busiris, which is far away in the Nile Delta; the old Egyptian name for Nazlett was Djedu, which means "ghosts") must have decided he could get more baksheesh if he cleared the sand from the vertical shaft in the haunches of the Sphinx. This must have caused him and his family and friends a great deal of trouble. But they were well rewarded in that they were able to expose a subterranean chamber, though from the surviving accounts, it appears that their clearance was not complete, since Wansleben and Veryard appear only to have peered into the chamber from the shaft. There is no evidence that they really were able to clamber into the chamber and inspect it fully. Probably the locals simply could not cope with clearing the chamber of all of its sand, and they thought that offering a glimpse to visitors prepared to thrust their heads inside would suffice. The encroaching sands kept pouring down the shaft, the man who initiated the clearance then presumably died during the forty-three years that intervened before Shaw's visit, and the locals were too lazy to keep the shaft open. However, the entrance remained exposed, and Shaw was able to measure it. It is interesting that Shaw found the sand that filled the shaft so compacted or intractable that he was unable to clear enough to examine the shaft as he wished to do.

The next traveler to describe the entrance to the shaft took much more trouble than Shaw did over the matter. He was Charles Thompson, who visited Egypt in 1733 and published the account of his travels in 1754.<sup>19</sup> Since Thompson's visit to the Sphinx took place five years before Shaw's book was published, Thompson's investigation of the shaft entrance was independent, and was not motivated by reading Shaw.

In volume 2 of his lengthy work, Thompson records this interesting information:

Before I leave this Place [Giza], I must take some Notice of a Colossus, at least the Head of one, which stands about a Quarter of a Mile to the East of the second Pyramid. It is usually call'd a Sphinx, which is a fabulous Monster, having the Head and Breasts of a Woman, the Wings of a Bird, the Claws of a Lion, and the Body like a Dog. This figure, among the Egyptians, was a symbolical Representation of the rising of the Nile in the months of July and August, when the Sun passes through the Signs Leo and Virgo. They likewise made use of it in their Hieroglyphicks to represent a Harlot, intimating the Danger of being captivated by the Charms of a faithless Woman, whom the fond Lover in the End finds as cruel and rapacious as a Lion. Of this Sphinx however, near the Pyramids, there is little to be discern'd but from the Shoulders upwards, being a monstrous Bust of a Woman, all cut out of the solid Rock, and never separated from it; except the upper Part of the Head, which seems to be adventitious [added on]. It is almost thirty Feet high, fifteen feet from the Ear to the Chin, and above thirty feet wide at the lower Part of the Neck or Beginning of the Breast. The sand is so accumulated about it, that one can but just discover the Top of the Back, in which there is a Hole about five Feet long, seventy-five [feet] from the hinder Part of the Neck, and thirty from the Tail. We could not get up to the Top of the Head, but those who have done it report, that there is a round Hole, by which a full-grown Person may descend into it, from whence it is supposed the artful Priests deliver'd their Oracles. Pliny makes mention of this Sphinx, and tells us that it was thought to be the Sepulchre of King Amasis. The Rock is dug away all round the Sphinx to a considerable Distance, and the Stone was undoubtedly employ'd in building the Pyramids, with which some Moderns have supposed it has a subterraneous Communication.<sup>20</sup>

Like all the visitors mentioned until now, Thompson persists in the view that the head of the Sphinx is the head of a woman. This was obviously stressed by all the guides and is a continuation of the long and persistent tradition that the Sphinx represented the goddess Isis, although her name had long been forgotten by this time, of course. (The sacred *nemes* headdress of the pharaoh, seen on the Sphinx, was presumably interpreted as a woman's head scarf or bonnet of some kind, leading people to believe that the face was that of a woman, as no man would look like that. After the end of the Ptolemaic Period, native Egyptian traditions of the pharaoh were forgotten, and the existence of such a pharaonic headdress would no longer have been remembered.)

Thompson's attention was also drawn to the "hole in the top of the back," doubtless by the same guides whose fathers or grandfathers had once cleared the shaft of sand before it filled up again. By 1733, the sand had risen so much higher that Thompson only says he could "just discover" the hole. If we had had any doubts until now of the hole possibly being the one at the rear base, these are now wholly dispelled. This hole is in the top of the back. And just to be more specific, Thompson conveniently tells us precisely where in the top of the back it was, for he has the good sense to measure the distance of the hole from the head! It is 75 feet from the back of the head, and 30 feet from the tail. In other words, it is at the point where the hips commence, and precisely where the huge crack is shown in figure 1.31 to 1.34, which Baraize completely filled with modern cement.

Thompson must have made greater efforts than Shaw did to clear the sand away from this hole, because whereas Shaw described it as 4 feet long, Thompson was evidently able to clear enough sand away to reveal a greater length of the hole, and says it is about 5 feet long. Whether it was 4 feet or 5 feet, it was a pretty large and conspicuous shaft entrance, and its complete destruction in 1926 can only be called criminal damage.



We do not have to wait long for the next visitor to see the shaft entrance. The famous Irish bishop Richard Pococke turned up at the Sphinx only a few years later, in 1739, and published the account of his travels in two volumes over the period 1743–45.<sup>21</sup> Pococke was successively bishop of Ossory and of Meath in Ireland. Not only did I consult Pococke's published book, but I also consulted the twenty-one volumes of his unpublished manuscript travel diaries that are preserved in the British Library.<sup>22</sup> The manuscript of the published material is significantly not included among the original travel diaries, which indicates that the original copies of that material went to the publisher and were not returned to Pococke again afterward, which was apparently standard publishing practice. However, some further remarks about the Sphinx were made by Pococke in a letter to his mother, which I give here first. "I went to the Sphynx the head much worn by time, especially in the neck, one just sees the top of the back & either a tail or a thigh in a sitting posture;—the whole by the nicest examination I could make seems to be cut out of the rock;—went into some catacombs & round the second Pyramid. We dined together & returned."<sup>23</sup>

The main description of the Sphinx mentions the rear shaft, which he does not bother to mention in the letter, and considering how well Pococke's book is known, it is amazing to me that no Egyptologist has ever mentioned this before:

Directly in front of the second pyramid, about a quarter of a mile to the east of it, is the famous sphinx H [a reference to his engraving, Figure XVI, where the Sphinx is marked H on a plan of the Giza Plateau] about half a quarter of a mile from the water when the Nile overflows, being on much lower ground than the pyramids. Here seems to have been the grand way up to these magnificent structures. . . The rock seems to have been dug away all round the sphinx for a great way, and the stone was doubtless employ'd in building the pyramids, the sphinx being cut out of the solid rock; for what has been taken by some to be the joining of the stone, is only veins in the rock. This extraordinary monument is said to have been the sepulchre of Amasis, tho' I think it is mention'd by none of the antient authors, except Pliny [36 12]. [Pococke's footnote here states: "My account makes the sphinx one hundred and thirty feet long, that is about seventeen feet more than Pliny. He says it was sixty-three feet high, probably taking in a plinth that might be cut out under it; so that about thirty-six feet must be buried in the sand."] I found by the quadrant that it is about twenty-seven feet high, the neck and head only being above ground; the lower part of the neck, or the beginning of the breast, is thirty-three feet wide, and it is twenty feet from the fore part of the neck to the back, and thence to the hole in the back it is seventy-five feet, the hole being five feet long, from which to the tail, if I mistake not, it is thirty feet; which something exceeds Pliny's account, who says that it is a hundred and thirteen feet long. The sand is risen up in such a manner that the top of the back only is to be seen; some persons have lately got to the top of the head, where they found a hole, which probably served for the arts of the priests in uttering oracles; as that in the back might be to descend to the apartments beneath.<sup>24</sup>

Here we see that the entrance to the rear shaft, "the hole in the back," is described once again as 5 feet long. I suspect that Pococke took the measurements of the distance from the head and tail directly from Thompson, as his letter to his mother does not indicate that he spent sufficient time at the Sphinx to have taken personally all the measurements that he reports. He adds that the rear shaft was possibly intended "to descend to the apartments beneath," but these were as invisible in his day as they were in Thompson's.

Following Pococke, the Danish traveler Friderik Ludvig Norden, known in English as Frederick Lewis Norden, visited Egypt. He was a captain in the Danish navy. He wrote a book about his travels,

which was published in French in Copenhagen in 1755. The English translation of his travels was published in 1757.<sup>25</sup> (A German translation followed in 1779.) Norden does not give much description of the Sphinx, merely saying that its “enormous size attracts your admiration, and at the same time you conceive a sort of indignation at those, who have had the brutality to disfigure strangely its nose” The reason I mention Norden is that he quotes the passage from Pococke that mentions the shaft opening, thus giving wider attention to the subject.<sup>26</sup> This wider attention was unproductive, however, as no one until now seems ever to have taken any notice of it whatever.

There seems to have been a kind of Curse of the Sphinx that made everyone blind, so that no matter how much was published about it, no one read it. Perhaps this book will break the spell at last.

That was the end of the early references to the shaft and chamber. Within decades, the sand had risen to such a height that even the entrance to the shaft had become invisible. Coutelle describes the Sphinx as it was during his visit in 1798 when he arrived with the Napoleonic expedition:

## 8. The Sphinx

It is in one of the faults of the Libyan hills, in the area which rises towards the west across the plain, that the sphinx has been cut; its height is about 13 metres [40 feet] above the actual ground, it remains like a witness and like a mass of stone raised up which has been superficially made to decorate this part of the hill. The rump, scarcely perceptible, seems only traced in the earth with a length of almost 22 metres; and the side which we wanted to discover in clearing away the sand which the winds had accumulated up to the level of the hill, presented no regular shape to us to a depth of approximately 9 or 10 metres [30 feet]: as to the hole which had been noticed on the [top of the] head, it is not deeper than 2 metres 924 mm [9 feet], of a conical and irregular shape.<sup>27</sup>

From this we learn that the Sphinx was hopelessly obscured by sand at this time. In fact, such was the deluge of sand over the monument that the French actually undertook an initial clearance in 1798, and although Coutelle mentions the clearing of one side to a depth of 30 feet, they later concentrated on exposing the rear (see figure 2 10 for a drawing by Robert Hay of the cleared rump) so that they might arrive at a reliable measurement of the length of the Sphinx. This is described by Coutelle’s contemporary Joseph Grobert:

Now we must leave the place far from the pyramids and go down towards the east. One follows the plateau; one passes in front of the meridional [north] face of [the Pyramid of ] Chephren, and one moves off as far as one can from it to the right. One goes down quite a gentle slope to find the Sphinx, almost entirely covered by sand, and of which the projecting head is concealed from the eye by the unevenness of the ground.



Figure 2.4. The Napoleonic Expedition

[Count Constantin-François de] Volney, the only author worth quoting when you want to recount a sound idea about this region, has rightly observed that the completely Ethiopian profile of the Sphinx bears witness, in an authentic way, that that nation has given the Egyptians its laws, its morals, and its religion. These last are no more than a colony descended from Sennahar and some vast regions which encompass Nubia; they have deteriorated by mixing with the Arabs. The foreigners who can stand the disgusting sight of the Hokheila [evidently a slave market] where Negroes are sold, will not find much there to resemble the profile of the Sphinx.

This monstrous statue, truly colossal, has been sculpted from a protruding piece of rock on which it sits. It is from a single piece. The quality of the stone perfectly resembles the rock itself despite being painted yellow, and the colour has been conserved up until our day in the places where it has not been damaged. Paintings found in Upper Egypt attest the talent of the Egyptians in composing colours and the influence of the dryness of the climate in preserving them.

The Sphinx is actually very dilapidated, much more than it was in 1738 when [Friderik] Norden drew it. I uncovered enough of its back to measure it. But there should be a very considerable excavation to uncover it entirely [this did not finally happen until 1926]. If one climbs onto the head, one sees a hole which is fifteen inches in diameter at its widest point, and about nine feet in depth. The direction is oblique. One sees that the depth has been diminished by stones which have been thrown down into it. It would be difficult to determine the use of this cavity, unless one presumes some underground passage which this passage leads to, and that the priests hidden in this place delivered their oracles from it. The Sphinx was definitely an idol, and the tutelary divinity of this cemetery. The placement of the surrounding sand makes one suspect that the plain, which is at the foot of the rock to the south, and which is more elevated than the usual flood level of the river, is equally strewn with tombs —A little to the south-west is a tomb where a Turkish hermit lives, a chapel around which several trees have been planted.<sup>28</sup>

Two subsequent English travelers testified to the extent of the French clearance. The first was Edward Clarke, whose description is given in full on page 493, where he comments upon the “wretched structure of brick-work, and small pieces of stone.”<sup>29</sup>

Clarke was obviously far more impressed by the French clearance than was the famous William Hamilton, who somewhat earlier had written:

A large and strong built causeway [the causeway of Chephren] has been carried from the entrances of



each of these enclosures [the funerary temples in front of the Pyramids of Mycerinus and Chephren] to the celebrated sphinx, whose enigmatical meaning still continues to puzzle the antiquaries of Europe, and who has proved during a long lapse of ages the faithful depository of the mysteries which envelop every object round her. The French excavated the body of the lion; which they found uninjured. but the sands of the Desert very soon rendered their labour vain, and the last time I saw the sphinx, the head and neck alone were visible. These have been evidently painted all over, and many characters are to be traced upon the head-dress; but we could not ascertain whether they were the sacred or popular letters of Egypt [i.e., hieroglyphics or hieratic writing]; some indeed bore a resemblance to the Arabic. It is still a point of dispute among the learned, whether this combination of the human and the lion's form is typical of the rising of the Nile, the summer solstice, or the wisdom and power of the deity. Such a personification of human intelligence and brutal force might be the original of the Greek Minerva; and agreeably to this supposition, the sphinx is a very common ornament of this goddess on her statues and on her medals.<sup>30</sup>



Figure 2.5 This is plate 1, a folding plate, from J. [Jacques François-Louis] Grobert, *Description des Pyramides de Ghizé*, Paris, "An. IX" (i.e., 1801). The top view shows the three Giza pyramids, the Great Pyramid at right, the Pyramid of Chephren in the center, and the Pyramid of Mycerinus at the left. Below the left corner of the Pyramid of Chephren, the head and back of the Sphinx may be seen sticking out of the sand. This is a clear indication of the extent of the clearance of the Sphinx made by the Napoleonic Expedition, and is confirmed by the plan seen in the view below. The French obviously cleared the entire back to arrive at a reliable measurement of the length of the sculpture. On the plan below, the Sphinx is marked "T" (which can barely be seen in front of the Sphinx's head near the bottom of the plan) and sits alone in the sand, with no trace shown of either the Valley Temple or the Sphinx Temple. Behind and to the left of the Sphinx, marked "S" on the plan, are three old sycamore trees (still surviving in the nineteenth-century photo in figure 3.9) and a building that had vanished by Victorian times, which we know from written sources was the residence of a Muslim hermit. The plan shows cultivated fields at bottom right, reaching right up to the cliff edge, and these would have covered the site of the Cheops Valley Temple, which has never been excavated (but some carved blocks from which survive as reused blocks at the site of Lisht, farther south). Today this unexcavated temple lies beneath a private house in Nazlet el-Samman. The plan also shows the contours very well, which indicate how the Nile's inundation waters (which

even in Victorian times still covered those fields and went up to the cliff base) were able to approach the feet of the Sphinx, which had no cliff barrier like that barring the way to the Great Pyramid. It is interesting to see that in 1798/9, when this plan would have been drawn, one boat pit was known in front of the Great Pyramid. The Chephren Funerary Temple and Causeway were completely covered in sand. Not a single mastaba can be seen. The empty square shown behind the Sphinx, more or less directly in the path of the Chephren Causeway, seems too far back to be Campbell's Tomb, and may be a ruined superstructure that once stood on top of the causeway above the entrance to the so-called Osiris Shaft, which lies beneath the causeway. (My account of the Osiris Shaft is published in *Egyptian Dawn*.) (Collection of Robert Temple)



Figure 2.6. An engraving of the Pyramid of Chephren, center, and the Sphinx, bottom center of the picture, as seen in the seventeenth century. The small building to the left of the Sphinx beside some trees was a hermit's cell, which had vanished by the nineteenth century but is mentioned in the early travelers' accounts. At left in the engraving is the Pyramid of Mycerinus. This is the top portion of plate 1 from J. Grobert, *Description des pyramides de Ghize*, Paris, 1801 ("An IX" of the Republic) (Collection of Robert Temple)

The only possible explanation for the conflicting statements of Hamilton and Clarke would seem to be that after Hamilton left in 1801, the French must have undertaken a second clearance before Clarke arrived. An unpublished manuscript by James Burton in the British Library reveals more interesting details about the various Sphinx clearance operations. Burton visited Giza in 1822, and his manuscripts show that he intended to publish an extensive account of his Egyptian travels, but he never did so. Perhaps because he was frustrated in this aim for some reason, all his papers were left to the British Library, where they have been carefully preserved but apparently rarely consulted. In fact, they are a priceless scholarly resource, full of wonderful information and illustrations. Burton was a scholar, and not just a casual visitor to Egypt. He was a serious student of the Arabic language and read a lot of Arabic histories. I have copied the following interesting remarks about the Sphinx from Burton's manuscript, but have omitted earlier ones, which include discussions of what various Arabic historians had said of it, what its Arabic name meant, a discussion of its original coloring, and quotations from Abdallatif and Denon:

The statue was mutilated by a bigoted enthusiast [old-fashioned word for a fanatic], Sheekh [Sheikh] Mohammed, about year of the Hegira—? [Burton left a blank for the date.] It was probably when the nose was thus broken that the Asp [uraeus] and head dress were removed. There is little doubt that it carried these ornaments, from the hole now remaining in the top of the head, which the natives have at some time or other enlarged, in the hopes of finding in the interior some hidden treasure. The head however is solid stone, and they soon found their labour useless. I think I remember Mr. [Henry] Salt having told me, that he found in excavating the temple between its paws, part of an asp in bronze. This will have been that placed over the forehead.

The rump was repaired with Mapara [?] stone probably by the Kornans [??]—their repairs were destroyed again by the late Defterdar in order to serve as building materials for one of his palaces.

Burton is obviously referring here to the Ottoman Turkish official called the Defterdar Bey. He acted as finance minister in Egypt and was directly appointed by the sultan in Istanbul. The Defterdar actually

ranked higher than the bey (provincial governor). The office of Defterdar was abolished in 1837. The Defterdar's aims were to squeeze as much money as possible out of the subject populations and exploit any and all local resources to the fullest possible extent. It is shocking that he carried this so far that he stripped stones off the Sphinx. It is impossible to know whether this account refers to the actual rump and its casing stones or whether it might refer to stones that had been used to try to fill up the shaft at the haunches. If the latter is the case, then by removing stones from the shaft in a rough manner, he might have caused the huge crack to open and the haunches to split off, as we see in the various photos. In other words, this "rape of the Sphinx" by the Ottoman Defterdar may have split the Sphinx at the point of the shaft.

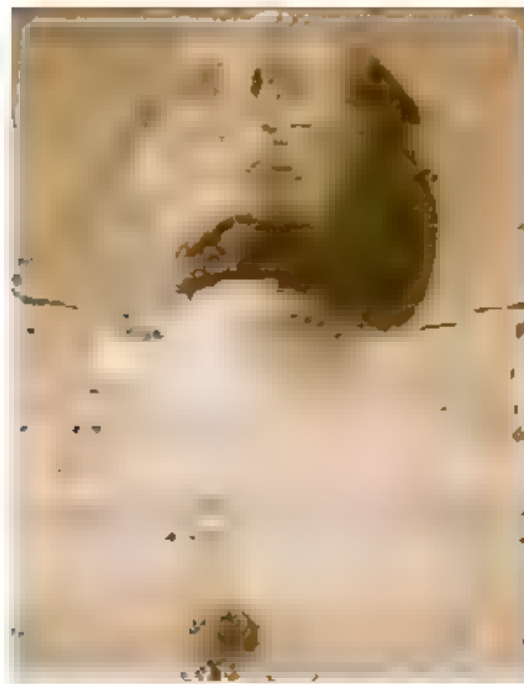


Figure 2.7 This photo shows the socket between the eyes of the Sphinx where the nose was apparently reattached after the fanatical sheikh Mohammed struck it off as being offensive to Islam in the Middle Ages (The story about the nose being shot off by soldiers is false.) (Photo by Robert Temple)

Burton's account continues: "Moorad Bey [Murad Bey, died 1801; see his portrait in figure 2.8] first uncovered the Sphinx but found nothing—he did not dig deep. The French then did it, and were equally unsuccessful. [Captain J.-B.] Caviglia finally succeeded, and the accompanying notice of the work is copied from the . . ." (here the text breaks off).<sup>31</sup>

The verso side of this manuscript leaf has Burton's copy of Henry Salt's plan of the paws and altar of the Sphinx (see figure 6.47 for Salt's plan, as it appeared in the *Quarterly Review*, which is the reference Burton intended to insert), with identifying letters and specific descriptions. No succeeding leaf has been bound into this manuscript volume, and the subsequent leaves by Burton change subject.





Figure 2.8. A portrait of Murad Bey, who died in 1801. According to a manuscript report by James Burton, who went to Egypt twenty-one years after Murad Bey's death, it was this Egyptian ruler who carried out the first modern excavations of the Sphinx, "but found nothing—he did not dig deep." Not long afterward, Egypt was invaded by the French, and they also made excavations at the Sphinx, commencing in 1798, "and were equally unsuccessful." They did, however, find evidence of an opening between the paws, which was doubtless the "altar crypt," part of which is still visible through a metal grille in the rock today (see figure 1.29) and the rest of which was sealed up in two stages 120 years apart, first by Henry Salt and then by Professor Selim Hassan. Engraving by Sonnini de Manoncourt, made in 1799, two years before Murad Bey's death. (*Collection of Robert Temple*)

We learn here what I believe is recorded nowhere else, that the Turkish provincial governor of Egypt at the end of the 1700s, Murad Bey, had actually attempted to clear the Sphinx prior to its clearance by the French in 1798. Perhaps he even tried to repair some of the damage caused by the Defterdar many decades before. Burton's comment that both Murad Bey and the French had been unsuccessful must mean that the apparent second attempt by the French was also a failure. Indeed, it was not until Émile Baraize cleared the Sphinx to the bedrock in 1926 that the Sphinx had been fully exposed since Roman times. If a search were made of the Ottoman records in Istanbul, some record of the Turkish treatment of the Sphinx would doubtless be found, both the Defterdar's despoliations and sale of stones and Murad Bey's partial excavation and restoration attempts.

I have already had occasion to point out that Caviglia, an Italian who also wrote French and spoke but did not write English, did not leave his papers in what we would consider proper order. He gave many of them to the British consul Henry Salt, who had supplied some of the funds for the clearance, and as we have seen in the previous chapter, Salt published a lengthy account of Caviglia's excavation of the Sphinx in the *Quarterly Review* in London.<sup>32</sup> A few of Caviglia's papers are preserved in the British Library, and I have looked at all of these. But as we shall see in a moment, some of his crucial papers relating to the Sphinx made their way to Florence, where they were consulted in 1833 by an English Egyptologist, none of whose notes of them appears to survive. But it was these very papers that described not only his clearance of the vertical shaft, but also his actual entry into the subterranean chamber! Unfortunately, I have no idea where in Florence these papers of Caviglia's may have been deposited, or whether indeed they are still there. My friend Stefano Greco and I undertook some preliminary searching together in Florence, and Stefano has continued this search. One unexpected find was an account in Italian by one of Caviglia's friends, Annibale Brandi, in another Italian town. The section dealing with the Sphinx has been

translated by Stefano and myself into English and is found in appendix 4. The information that it gives is discussed later on. In addition, we do have some further important information about Caviglia's activities preserved by Auguste Mariette, which is found in appendix 1, and that is discussed in a moment. And finally, as discussed later, some more material that had been "lost" since the Victorian era was recently published by the British Museum Press, having been found while moving offices. That Caviglia's work came to such an abrupt end because of his having a serious attack of sunstroke and being disabled meant that his reports were never finalized. He left Egypt suddenly, and apparently only returned to Giza to evacuate in the 1830s, more than fifteen years later.

That the Sphinx was cleared at the rear by the combined work of the French and remained so for a quarter of a century is shown in a rare rear-view drawing by the English artist Robert Hay in 1827, which I found in a manuscript in the British Library and reproduce in figure 2.8. This makes it clear that the rear portion of the Sphinx was entirely accessible for an investigation of the shaft and chamber beneath the haunches. And as we shall see, Caviglia fully cleared the shaft and the chamber in 1817 as well.

Caviglia spent ten months clearing the surrounding sand from the Sphinx, until he was incapacitated by sunstroke and had to stop, returning to his ship at Alexandria and resuming his life as a sea captain.<sup>33</sup> All this took place before Henry Salt published the account of Caviglia's work in the *Quarterly Review*. Caviglia's clearance and exploration of the shaft and chamber beneath the Sphinx must therefore also have taken place before Salt's publication. But why did Salt not mention it? Why, indeed, did Salt mention nothing whatever of the discoveries of tunnels and entrances relating to the Sphinx? Here we must recall the accusation made by Count de Forbin, as recounted in the first chapter, that Salt through arrogance and stupidity had blocked up some of these so that they could not be investigated further. Salt may have thought that as he was contributing to the funds that paid for the excavation, he had a right to interfere with it in this way. But what can have been his motivation? Was he just an ignorant lout? Perhaps he thought of these things as blemishes, and, having exposed the Sphinx to view, he wanted to tidy it up and plug the holes, to render its appearance more beautiful. If he thought of the Sphinx primarily as a magnificent monument that he had helped reveal to the eyes of mortals for the first time since antiquity, he might have been impatient of "imperfections" such as openings, passages, and so forth, which would have meant nothing to him, as he was not an archaeologist. It may simply be that in a pompous sort of way he was just a silly fool, Count de Forbin evidently thought so.



Left: Figure 2 9. This is Henry Salt's drawing from 1817 of the cleared space beneath the chest of the Sphinx, between its front paws. The suspended object in the center top of the drawing is the remnants of the Sphinx's beard, which had been affixed to the recarved head of the Middle Kingdom pharaoh Amenemhet II, either by himself or later during the New Kingdom, when the Sphinx was excavated by Thutmosis IV. The large upright stela in the center of the scene is the Dream Stela, Henry Salt's separate drawing of which is shown in figure 3.7 (Modern photos of this stela are shown in figures 3.8 and 4.19.) At the time of its excavation by Caviglia, the inscription on the Dream Stela was intact, as I have discovered from an account in Italian left by a friend of Caviglia, which was located by my friend Stefano Greco in an obscure Italian library, and the Sphinx portion of which, translated by us into English, is published here as appendix 4. By the time Salt was able to draw the inscription some weeks or months after its excavation (it could not yet be read, because hieroglyphics had not yet been deciphered), well over a third and nearly a half of the inscription had vanished. Since then, even more has gone, so only about half remains. The new account that Stefano and I have found explains that the inscription was peeled off by the superstitious inhabitants of the neighboring village of Nazlet el-Samman, chiefly women believing it could help them have babies if they had fragments in their homes, presumably under their beds to aid conception. This drawing is found in *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Perring, London, 1842, third appendix volume, plate opposite page 110 (Collection of Robert Temple).

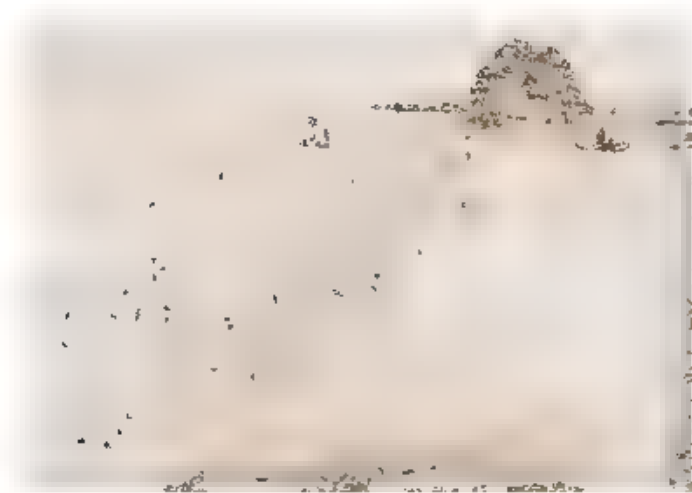


Figure 2 10. A computer-enhanced reproduction of a drawing by Robert Hay done in 1827, showing the rear of the Sphinx free of sand and largely exposed at that date. The original drawing is exceedingly faint and is preserved in the Papers of the Robert Hay Expedition to Egypt, 1826–1838, in the British Library Manuscripts Collection (Add. Ms. 29.812, folio 67 recto). The Old Kingdom blocks are clearly drawn at the base, and thirteen rows of them are shown. The three human figures on top of the Sphinx's back are standing near the point of descent leading to the chamber beneath the Sphinx, which was entered in 1817 by Caviglia and in



But how do we know that Caviglia really entered the chamber beneath the Sphinx? This was discovered by an early English Egyptologist named Charles H. Cottrell, who seems to have published nothing of his own, but who translated a huge work by Baron Bunsen on the antiquities of Egypt, entitled *Egypt's Place in Universal History*.<sup>34</sup>

In 1855, the French archaeologist Auguste Mariette related the story, which was reported in a French periodical of that time:

In 1833 an English Egyptologist, Mr. [Charles H.] Cottrell, to whom one owes the translation of the work of Monsieur [Christian Carl Josias Freiherr von] Bunsen on Egypt [*Egypt's Place in Universal History*], found in Florence among the papers of Caviglia, who undertook the first of the extensive excavations around the colossus [the Sphinx], the plan of two chambers discovered behind the Sphinx, and which contained hieroglyphic texts. Monsieur [Samuel] Birch had the thought that if one succeeded in rediscovering these two chambers, the inscriptions in question would reveal the origin of the gigantic statue. Monsieur le Duc de Luynes [Louis-Charles d'Albert, Duc de Luynes], alerted to this fact by Monsieur [Vicomte Emmanuel] de Rougé, wished, with his well known liberality, to help our compatriot [Mariette is referred to here] to pursue this curious quest, and furnished him with the funds necessary for the excavation. This act of generosity was soon followed by an allocation of funds from the French government, and Monsieur Mariette came to clear the Sphinx, which he found to be only a natural rock of which the art of the ancient Egyptians had, so to speak, finished the shapes in order to make the statue of a god. That god is Horus, and the temple where he was worshipped has been rediscovered to the southeast of the colossus [the "colossus" is the Sphinx; this temple is now called the Valley Temple]. It is an enormous square enclosure comprising a crowd of rooms with galleries made of gigantic blocks of alabaster and granite. This edifice, completely devoid of hieroglyphic inscriptions, like most of the monuments dating from the most ancient pharaohs, dates, according to all probability, from the fourth dynasty.

The Egyptians had sculpted the head of the Sphinx and filled up the large natural hollows and moulded the shapes with masonry. This colossus is found at the bottom of a sort of pit of which the lateral walls are twenty metres away from each of its sides. *Monsieur Mariette admits that in antiquity the water of the Nile could have entered this pit.* [My italics, as this is also my own idea, at which I arrived entirely independently, and which is discussed at length later in this book, in chapter 6, which I wrote before I discovered the report about Mariette, which is inserted here.] Later the Greeks had built the steps discovered by Caviglia for going down into the pit. Against the right side of the Sphinx the traveller had found a huge Osiris statue made of twenty eight pieces, reckoned to be the number of pieces into which the body of Osiris had been cut according to the Egyptian myth. [This statue seems to be otherwise unknown, and may have stood on one of the two "cupolas" beside the Sphinx on the southern side, in which case it was probably of New Kingdom, Saite, or Ptolemaic date.]

The Sphinx has been measured in all of its dimensions. Its height is 19.7 metres. In the back and across the hindquarters of the statue, Monsieur Mariette recognized the vertical shaft, the existence of which had previously been pointed out by Vansleb [Johann Wansleben] and [Richard] Pococke, who thought that one could penetrate further down from there into existing chambers, according to their supposition, inside the colossus. This shaft, explored with care, presented at its bottom a roughly

hewn room, which was in reality just a natural fissure enlarged by the hands of man. In this room lay some fragments of wood which gave off a strong smell of resin when burnt, which led one to believe that the wood came from a sarcophagus.

One had supposed that in antiquity the Sphinx was entirely painted red, but nothing indicates that this had been so. Only the face was once covered in this colour after the reign of Ramesses the Great [sic; Rameses II], for the beard of the colossus represents an act of worship in the time of that pharaoh, over which the red had been applied.

The Greek inscriptions found near the stairs of the Sphinx tell us that this colossus bore the name of Harmakhis, the significance of which has still not been discovered.

The excavations of the Great Sphinx did not lessen the honour due to the intelligence and to the devotion of Monsieur Mariette in his magnificent discovery of the Serapeum [at Saqqara]. We need to return to this archaeological event before recapturing, as we will be doing in one of the forthcoming issues, the analysis of the works of the Academy since our last survey.<sup>35</sup>

So now we know not only of Caviglia's excavation and study of the shaft and chamber but of Mariette's as well. Caviglia is said to have done plans of two chambers beneath the Sphinx, and we must suppose that the second one was the hollow at the bottom of the rump tunnel, since Mariette speaks of only one chamber at the bottom of the vertical shaft. As there are certainly no hieroglyphic inscriptions in the hollow of the rump tunnel, the hieroglyphic inscriptions referred to must have been inscribed on the walls of the chamber at the bottom of the vertical shaft. This would seem to indicate a date that must be later than the Fourth Dynasty, and hence not contemporary with Chephren. In fact, there is every reason to believe that this vertical shaft is what archaeologists call an "intruded grave," thrust down into an ancient monument at a much later time. But it must have been the grave of a late pharaoh, since no one less than a pharaoh would have dared to give himself a grave under such a prominent monument as the Sphinx. Perhaps it was indeed the pharaoh known to the Greeks as Amasis, so the report of Pliny that the Sphinx was his grave would actually be correct. Amasis was a late pharaoh who reigned 570–526 BC during the Twenty-sixth Dynasty, which is known as the Saite Period. This was a period when there was a great preoccupation with and reverence for the most ancient monuments, a social and cultural tendency known as "archaizing," rather like the European Romantic movement, when picturesque Greek and Roman ruins were idealized. Amasis is just the sort of late pharaoh who would have intruded his own grave into the Sphinx. So it may well be that the vertical shaft and chamber below were cut in 525 BC, and that the vertical shaft was placed at the precise spot where a much earlier top entrance to the rump tunnel had existed. If this was the case, the burial was probably not cut more sensibly in the base of the Sphinx because that base was still covered with sand. Indeed, since the Persians conquered Egypt shortly after the death of Amasis, and they pillaged and despoiled much of Egypt when they did so, it is highly likely that any such grave of Amasis would have been entered and robbed within a generation of his death. On the other hand, of course, the shaft and chamber may well have been much older, and the mention of the name of Amasis by Pliny may be entirely erroneous and misleading. If we could get into the chamber again, we could doubtless read the hieroglyphic inscriptions, and then we would probably know whose tomb it was. Or, there is one more alternative possibility: if Caviglia's missing papers could be located at Florence or elsewhere, he may well have copied down some of the inscriptions in his notes accompanying the plans.

My friend Stefano Greco and I have searched for these papers in Italy for more than a year. We did some searching when we were together in Florence in early 2007 but were unsuccessful. Stefano has



continued the search, but so far with no success. He did, however, discover a rare book, which seems to be the only surviving copy in the world, as no other is known anywhere. It is a forgotten booklet written by an Italian friend of Caviglia's named Annibale Brandi, identified by his initials "A.B.," and privately published by him in Livorno in 1823. This booklet is entitled *Descrizione compendiosa delle piramidi di Giza in Egitto* (*Compendious Description of the Pyramids of Giza in Egypt*). Most of it is devoted to describing Caviglia's astonishing work and findings inside the Great Pyramid, of which he cleared the entire Descending Passage of rubbish (several hundred feet of it!), entered the subterranean chamber for the first time since antiquity, and cleared it, and also descended the "well shaft" by dangling 175 feet on a rope. Caviglia was a determined and intrepid man! At the end of the booklet is an account of Caviglia's work at the Sphinx, which Brandi calls "the Andro-Sphinx" because of its having the head of a man. Although this previously unknown account is interesting, it does not mention the chamber beneath the Sphinx. Presumably it was entered by Caviglia only after this particular friend had returned to Italy, or otherwise Caviglia might have sworn his friend to secrecy about the subterranean chamber beneath the Sphinx. Stefano has translated the latter portion of this booklet that refers to the Sphinx, and it is published here as appendix 4. This text contains the shocking information that the entire text of the Dream Stela was intact at the time that it was excavated by Caviglia. Today, the bottom half of the inscription is lost, and most of that was lost (but for a few fragments, now gone) by the time Henry Salt carefully copied down what was left. Salt's drawing is shown in figure 3 7, and that contains much more than survives today. The inference to be drawn from this is that after the departure of Caviglia from Egypt, the most severe damage was inflicted on the Dream Stela intentionally, and the bottom half of the text was obliterated by someone wishing to destroy it, perhaps for religious reasons, as a text relating to an "idol." Salt probably made his careful drawing of what was left because he was afraid the whole text might at any moment be defaced (as indeed more of it was), so he wanted to record what remained to preserve the information for posterity, even though he could not read it. (We must remember that at this time no one could yet read hieroglyphics, so no one had any idea what the Dream Stela's text said.)

In 2007, at the same time that Stefano and I were searching for Caviglia's notes in Italy and unexpectedly discovering the sole surviving copy of Brandi's privately printed booklet in Italian, the British Museum published a booklet containing a discovery of its own, entitled *The Sphinx Revealed: A Forgotten Record of Pioneering Excavations*.<sup>36</sup> Five years earlier, in the spring of 2002, the Egyptian Department of the British Museum had to move its offices, and after they settled into their new location, the personnel (presumably the two scholars Patricia Usick and Deborah Manley, the authors of the published booklet) noticed a couple of interesting old bound books sitting around. One contained a manuscript and the other contained its accompanying drawings. These had been in the department for at least 175 years, and no one had paid any attention to them, except that someone in the nineteenth century had taken great care to preserve them and have them carefully bound and even gilt, and had seen to it that they were cataloged. (This may well have been Sir Edward Wallis Budge, the Victorian head of the department, who was a very serious and devoted scholar.) The two authors tactfully refer to the shameful ignoring of this material for nearly two centuries by saying that it had "never been studied in depth and many of the illustrations appeared to be otherwise unknown." That is presumably a way of avoiding criticizing their past and present colleagues too harshly, and avoiding making professional enemies. (Academics have to behave like this all the time in self-protection, for there is no sphere of human activity more vicious than the academic world.) The history of these volumes shows the dangers of sole copies of important material languishing in the private offices of museums where no one has access to them but the staff. Usick and Manley clearly saw the need to take action, and I hope they are not hated too much by their colleagues for daring to do so. But it now means that the rest of us, who are mere lowly

uninitiated folk who are not allowed into the inner sanctum of the Egyptian Department, can read what they have been hiding away since at least 1827. If the material had been deposited in the British Library's Manuscript Collection where it belonged, it would probably have been seen and studied by many scholars long ago.

Fortunately, the British Museum Press agreed to publish this important material, although the illustrations are so poorly reproduced that they all look as if they are viewed through a layer of mud. They are, how shall I say it, a kind of dirty dark gray. Clearly, the press does not realize that we are living in the twenty-first century, when there are such things as modern printing facilities. There is no excuse for the scans that were used being printed in such an appalling and semivisible condition. It is really very difficult to make out the detail in many of these drawings.

The text and drawings are those of none other than Henry Salt! They are entitled, on a manuscript title page bound in front of them, *Memoir on Pyramids and Sphinx by H. Salt, Esqr.* and dated on the title page 1821. This is the manuscript record that Salt intended for official publication in London of the excavation of the Sphinx by Caviglia, and it superseded the interim publication based on his notes in the *Quarterly Review* in 1818 (see endnote 22 in chapter 1). But it was never printed until now, although it needs to be stressed that some of its contents were word for word the same as material that had appeared in the *Quarterly Review*, so not all of it is new. Salt sent it from Egypt; he died six years later, and nobody did anything to bring it out. Two of his colleagues in London went through it and made a lot of textual editing changes, most of them unhelpful and in a style far inferior to Salt's own. (These changes have been carefully included in the British Museum publication by use of italics, because Usick and Manley have been very conscientious and done an excellent, scholarly job.) And then nothing happened and the whole thing sat around in the department's office and was ignored until 2002.

The frontispiece of the British Museum publication is a portrait drawing of Caviglia "in 1827, drawn by H. Salt from life," which is preserved in the Bodleian Library. I was not previously aware of the existence of this drawing, strangely preserved by an archive acquired by the National Trust and deposited in the Bodleian. The archive is that of the manuscripts of Sir Gardner Wilkinson (1797–1875), which were finally cataloged and opened to public access for the first time in Oxford in 2001. In that case, it took a mere 126 years for the material to be made available, which greatly undercuts the British Museum's 175-year availability rate. Clearly, Egyptological resources move exceedingly rapidly when judged by the standard of the ages, and in comparison to the time elapsed since the Fourth Dynasty. Indeed, one might justly and reliably say that Egyptological material is most definitely made public at a speed more rapid than the movement of the tectonic plates of the Earth, whatever skeptics might think.

It is unfortunate that the portrait of Caviglia as reproduced by the British Museum Press looks as if someone had just turned the lights out, and it is being made out dimly by some light leaking in from the next room.

The account by Salt also does not mention the chamber beneath the Sphinx. I am convinced that Caviglia had reservations about Salt, who intruded on his work and joined him by offering some funding, and that Caviglia did not reveal all of his activities to him. The newly published account contains comments by Salt about Caviglia's determination to find a "door" in the Sphinx, however.<sup>37</sup> Although Salt points out that Caviglia employed as many as one hundred laborers daily,<sup>38</sup> he also points out that some of Caviglia's activities "were carried on by a single individual [i.e., himself], attended occasionally only by one soldier."<sup>39</sup> This reveals that Caviglia did a lot of things entirely alone and could easily keep things to himself if he wished. He never seems to have been fully in Salt's confidence, and the only part of the Sphinx work that was fully and completely open to inspection was in front of the Sphinx. But even there,



where the entry to the subterranean chamber seen in figure 1.29 must unquestionably have been exposed, since clearance was made to bedrock and it could not have been missed, not a word appeared in any of Salt's reports about its existence. This leads to only two possible conclusions: either Caviglia found it and covered it up to keep it secret or Salt did know of it but chose to keep it secret himself. The latter seems more likely, as Count de Forbin was most likely referring to this chamber in front of the Sphinx when he made his accusations that Salt was blocking up passages and openings so that no one could investigate them. If we could find the missing Caviglia papers, we could probably find Caviglia's own report on this chamber, in addition to his description of the burial chamber at the haunches that Cottrell discovered in those papers in 1833.

Later in this book, the newly published Salt material will be mentioned again, because it includes the original drawing he made, the one engraved for the *Quarterly Review*, of a carved inscription (long since destroyed) that was found by Caviglia on the middle toe of the left paw of the Sphinx.<sup>40</sup> This reveals some information that will later be seen to be of the greatest possible interest to us in trying to determine what the Sphinx actually was and why it was created. But that is for a later stage of our quest, and is to be found in chapter 6.

In 1853, Mariette had earlier written to the French Egyptologist Viscount Emmanuel de Rougé, mentioning the subterranean chamber beneath the haunches of the Sphinx as follows: "The Egyptians remedied these faults [holes in the rock] by covering the entire body of the monument with two layers of masonry. The first, which touches the rock, was intended to fill up the considerable cavities which occurred in the stone. These cavities are numerous; I came across one at the commencement of the thigh, into which I penetrated along with several people. It is without doubt the one which Father Vansleb [Wansleben] took to be a mortuary chamber."<sup>41</sup>

These notices by Mariette were not the last time the vertical shaft and the burial chamber beneath the Sphinx were mentioned in print. The next occasion was in 1897, in an extraordinary article by the distinguished archaeologist Ludwig Borchardt, who for decades was the director of the German Institute in Cairo. I have carefully translated this entire article and reproduce it in full in appendix 2, not because of its mention of the shaft and chamber, but because I am convinced that Borchardt's unusual theory about the dating of the Sphinx has an unexpected relevance, as I explain at length in chapter 4. Borchardt's theory has been dismissed until now, but I believe it needs to be resurrected, because it is "true" in a way he never imagined. But for the moment we are concerned only with his comments on the vertical shaft and the subterranean chamber. The article to which I refer is a rare one entitled (in translation) "Concerning the Age of the Sphinx at Giza," and it appeared in an obscure German scholarly journal.<sup>42</sup> I have been extremely fortunate to obtain an original offprint of this article, which few people alive today have ever seen, and which seems to be largely unknown in Egyptological circles today.

The main purpose of Borchardt's article was to discuss the age of the Sphinx, and the vertical shaft and subterranean chamber are mentioned only as part of a list of features contributing to an argument. The first mention is as follows: "The occurrence of two vertical shafts on the back of the Sphinx, one of which ends in a burial chamber, in which coffin boards have been found. From this we can infer the earlier existence of a mastaba on the back of the Sphinx."<sup>43</sup>

This interpretation of a mastaba (burial edifice) having preceded the carving of the Sphinx, which then incorporated it, is part of Borchardt's argument about the true age of the Sphinx. He then makes further remarks elaborating on this notion, in the context of his belief that the Sphinx was carved by order of Pharaoh Amenemhet III of the Middle Kingdom, who reigned from 1818 to 1773 BC.



One could imagine the history of the Sphinx in general, mixed with some guesses, in the following manner:

The Sphinx was hacked out of the bedrock, perhaps by Amenemhet III, by destroying one of the mastabas standing on a hill, which now constitutes the back of the Sphinx. And partly by building it up with ashlar blocks. It shows the king in the shape of a prostrate lion with a human head—in front of the chest with a divine image, perhaps of Harmachis or Khepra. When later the monument was largely buried, then Thutmosis IV had it cleared for the first time. In the stela celebrating this fact we find already the mixing of the meaning of the image of the Sphinx itself with the divine image in front of his chest. Perhaps it was then that the braided divine beard was added to the image. The Sphinx was partially freed from the sand in the nineteenth Dynasty.

In a later time, the Sphinx was surrounded by a high brick wall in order to protect him from the drifting sand. From the east, a large staircase led down to the small chapel in front of the divine image in front of the chest. All these means of protection have not helped a lot. In this century it was necessary to dig him out again repeatedly, last in 1883, and actually it would be necessary again today.<sup>44</sup>

Later in this book we shall see why Borchardt's strange theory about the Sphinx having been carved in the time of Pharaoh Amenemhet III should be looked at more carefully. The reason is rather unexpected but may be crucially important. However, it is not surprising that Borchardt's article has lapsed into total obscurity today, since there is probably no one alive who could possibly accept the bizarre notion that the Sphinx was carved as recently as 1773 BC. I am far from being a general champion of Ludwig Borchardt, however important much of his work may have been. He was undoubtedly arrogant and pompous to an extraordinary degree. He was also wrong about many things. But one of the greatest of ironies is that what people might be forgiven for thinking of as his greatest folly, namely the suggestion that the Sphinx dates from 1773 BC, which appears wholly absurd on the face of it, probably conceals an amazing truth, which I will explain fully in chapter 4. Borchardt's bold and meticulous analysis of certain evidence that led him to his strange conclusion must be examined very carefully indeed. But for the moment, it bears little relevance to what we are considering here.



Figure 2.11 In the New Kingdom a pharaoh offers a miniature "sphinx" (as conceived at that time) to the god Khonsu in the Temple of Khonsu at Karnak. At this period, Khonsu was the god of the moon, and as such measured the passage of time. In earlier eras this had been a function of Thoth (*Photo by Robert Temple*)

It is interesting, though, that in the pursuit of his notion, Borchardt considered the vertical shaft and subterranean chamber sufficiently important that he was prepared to view them as primary features, and the surrounding Sphinx itself as secondary in origin! And he must have inspected what he could of the evidence very carefully indeed. Probably the shaft and chamber were again filled with sand in his time. But as we see quite clearly in the photos in figures 1.31 to 1.34, a gigantic crack had opened in the Sphinx at the point of the shaft, and the rear haunches look as if they were about to detach from the body entirely. This would have enabled anybody in Borchardt's time to form a very clear idea of the importance of this vertical shaft, which had been so prominent that it had effectively split the body of the exposed sculpture. And doubtless it was the clearance of the Sphinx from its surrounding sand and Caviglia's further clearing of the shaft and subterranean chamber(s) that precipitated the splitting away of the haunches, since all support, both internal and external, had been removed. Any damage caused by the previously mentioned Turkish Defterdar would then have been worsened by exposure and the loss of support of the surrounding sand. When Baraize filled this entire section with cement in 1926, he may have thought of himself as heroically "restoring" and saving a disintegrating monument from potential collapse.

By the time the great Egyptian archaeologist Selim Hassan came along, in the mid-1930s, and carried out the final and complete clearance of the Sphinx and total excavation of its pit and surroundings, all possibility of exploring and studying the vertical shaft and the subterranean chamber(s) had been destroyed by Baraize ten years before. Hassan was thus able to discover nothing about them. But this does not mean that he was unaware of them. Indeed, he is the last person to mention them in print, as recently as 1953. That no one has noticed that he did so is perhaps the most puzzling of all the lapses of students of the Sphinx, or perhaps I should say it is the most prominent of many acts of mass blindness and refusal to see, which I call consensus blindness, a psychological condition with its origin in animal behavior (humans being animals, however much they try to deny it, and most of their activities forming a subdivision of animal behavior). I have discussed consensus blindness at length in my earlier book, *The Crystal Sun* (2000). The belief that putting evidence in front of people's eyes will lead to recognition and

acknowledgment is naive and false. People see what they want to see, not what they are shown. That is part of the definition of the human species.



Figure 2 12 This is the south side of the Sphinx's haunch area. All the stones along the foot are from the modern restoration of the monument. The upper tip of the tail has disappeared and three courses of modern stone have been cut and added to it. In the center, the upper half of the body consists of material added by Baraize in 1926 to fill the crack that had formed at the point of the intruded vertical shaft leading to the tomb chamber directly below, as described by numerous people who entered it in earlier times. We can be confident that this filled-in vertical shaft wasn't contemporary with the carving of the Sphinx, because the tomb chamber beneath the Sphinx was covered in hieroglyphics which was not a practice that existed prior to the Fifth Dynasty (Photo by Robert Temple)

Hassan gives a great deal of attention to Ludwig Borchardt's article about the age of the Sphinx, and he even translates part of it into English (although his translation contains some unfortunate errors, because his German was not good enough; and in any case, Borchardt wrote in a difficult and old-fashioned style of the nineteenth century). Hassan spells *Amenemhet* in the form *Amenemhat*, which is an equally acceptable spelling. (Egyptian vowels were not explicitly written, and versions of words and names rendered into European languages often vary in this way as a result of changing fashions and personal preference ) Hassan naturally dismisses Borchardt's theory about this pharaoh's association with the Sphinx, and he does so in the strongest possible language:

Under the title "*Ueber das Alter des Sphinx bei Gizeh*," Borchardt has indulged in an astonishing flight of fancy! . . . It seems to me that Borchardt had gone to a great deal of trouble to prove a theory that is altogether wrong from the beginning to the end; that is if he is not having a joke with the scientific world, and indulging in a little "leg-pulling" at our expense . . . If Borchardt was really serious about this article, then I think that of all the theories that he ever put into writing, he must have bitterly regretted having published this one!<sup>45</sup>

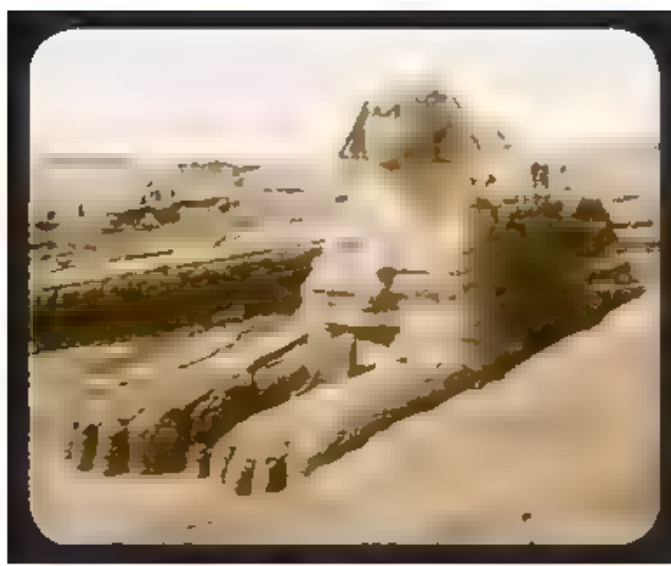


Figure 2.13. A photo of the Sphinx taken in the 1930s, during the final clearance of the monument by Selim Hassan. Railway lines for carrying away the debris are in the foreground. The face has been "restored" with modern cement filling all the gashes and holes including the large gash over the left eye (see figures 1.16, 1.17, 1.21, and 6.4 to 6.6). The lappets, or side flaps, of the *nemes* headdress have been extended down to shoulder level on both sides by clearly visible modern concrete; the original stone of the lappets, which had been a bit raggedy (see figures 1.5 to 1.7, 1.20 and 1.22 as they appeared before), has been chipped away and made level for the addition of the concrete. Today the striking difference of color between the modern concrete and the old stone is no longer so obvious. This photo must have been a "proud portrait photo" taken of the just completed restoration of the face at the request of Selim Hassan, during the first day or two while the concrete was still drying and was thus still very pale. Scaffolding is in place on the northern side of the Sphinx and at the top of the back. A workmen's gangway has been made along the northern side halfway up, apparently of cement. Considerable amounts of restoration stone and cement seem to have been added later on to the northern side after this photo was taken as this photo shows (although it is in shadow) that the northern side was extremely worn away and the Sphinx was there narrow-bodied in a way that it is not today. In fact, the shape is more like that of a dog, receding prominently inward at the side. As for the gap at the commencement of the haunches where the old vertical shaft to the subterranean chamber existed (as in figure 1.31, taken in 1921), we can see that it has been completely filled. Baraize plugged it with cement in 1926. Certainly, no film star was ever more botoxed or had more face lifts than the poor Sphinx has had "cement jobs." (*Collection of Robert Temple*)

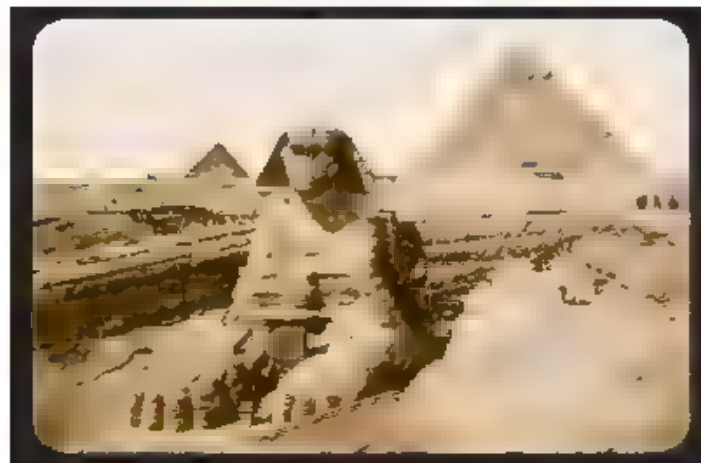


Figure 2.14. A photo from 1936, showing Selim Hassan's excavations in progress at the Sphinx. (*Collection of Robert Temple*)





Figure 2 15. This snapshot was taken by a British tourist in 1936, during the excavation and restoration of the Sphinx by Selim Hassan. This is the only known photo showing the rear of the Sphinx during this period. It shows the fantastic extent of the erosion of the natural stone of the Sphinx's rump, and reveals that Hassan was collecting fallen blocks of stone and "reconstructing" the rump with them to such a depth that the rump as we see it today protrudes by perhaps as much as 10 feet from the actual underlying stone itself. At the top of the ladder at the rear in this photo is a platform made of replaced stones big enough for at least a dozen people to stand on! Nowhere in his excavation report does Hassan mention that he did anything like this. To the left in the photo are the modern walls constructed by Baraize in 1926 to hold back the sand on the north side. Although he later demolished these, at this stage in his work Hassan was using them to anchor his planking gangways for his workmen to get across to the body of the Sphinx. It is believed that no other photographic evidence of any of this work exists, and this has never been published before. In the distance, it can be seen that the Sphinx Temple has not yet been excavated. (*Collection of Robert Temple*)



Figure 2 16. A snapshot taken by a tourist in 1936, during Selim Hassan's work on the Sphinx. The severely eroded stone of the uncovered rump is visible here from the side. As for the haunch area where the intruded shaft was, we can clearly see that Hassan erected special scaffolding to attend to that precise area. He must have found it necessary to add further filling and patching to Baraize's efforts of ten years before to fill in the broken-off haunch and smooth out the surface of the monument, restoring it to look like a single piece of sculpture again. The scaffolding erected in the front of the Sphinx has a platform used by masons to smear modern cement over the surface of the entire neck of the Sphinx. (*Collection of Robert Temple*)

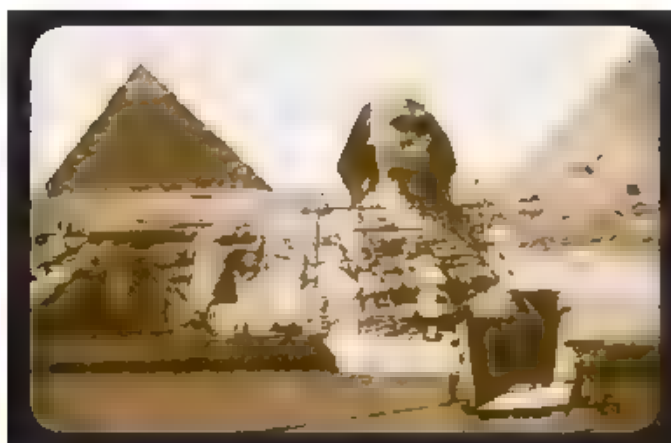


Figure 2 17. Here is the scaffolding platform used for smearing the modern cement onto the Sphinx's neck in 1936. At left we see Selim Hassan's southern gangway descending from the Chephren Causeway into the Sphinx Pit on that side. (*Collection of*



Figure 2 18. An engraving of the Sphinx from the nineteenth century. The prominent crack in the rear, by which one could descend to the chamber beneath, is highlighted here. (Collection of Robert Temple)

Within the extensive quotes from Borchardt, Hassan includes the description of the “two vertical shafts in the back of the Sphinx, one of which ends in a tomb chamber, and contained coffin boards.”<sup>46</sup>

With this explicit information included in the most recent and definitive excavation report on the Sphinx by its modern excavator, why has no one noticed or commented on it? Hassan certainly does not dismiss this information in the way he dismisses the theory of the Sphinx’s association with Amenemhet III. It is there for all to see.

And so this brings us up to a time that is more or less modern; 1953 is not all that long ago. There are still people alive who knew Hassan. Between a third and half of the world’s present population must have been alive in 1953. It is not an inaccessible era, lost in the mists of time.

And yet all the “experts” on the Sphinx are in total ignorance of every piece of evidence that I have just presented, knowing nothing of a total of 281 years of discussion of the vertical shaft and subterranean chamber beneath the haunches of the Sphinx. The blindness to this question reminds me of the mass blindness to all evidence of ancient optical technology, which I reported at such length in *The Crystal Sun*.<sup>47</sup> In that book I described my discovery of more than 450 ancient optical artifacts and lenses, and published photos of many of them. Evidence of the use of magnifying aids goes back to 3300 BC in predynastic Egypt! And yet all “experts” in the world were ignorant of this. They thought there were no optical artifacts at all. And this was despite the fact that many ancient lenses are prominently on display in museums around the world. The evidence is all around us, and can readily be seen in Athens, Cairo, London, and elsewhere, by any tourist. But no one could see it, despite the fact that it was in front of them. This was because they were convinced it could not exist. Physical evidence, even hundreds of items of it, is useless when people have no mental faculties to allow them to register it. It may register on the optic nerve, it may be perceived by the retina, but the mind is a blank. No impression is made. This case history of what I have named “consensus blindness” is most alarming; it shows that humanity is a strange species indeed, in which massive amounts of evidence may be thrust under the noses of us humans and be totally ignored. We are a stubborn lot. We just refuse to see what we are convinced cannot be seen. It is really the reverse of “The Emperor’s New Clothes,” the fable in which people see what isn’t there. The real problems of humanity lie in the opposite direction, in *not* seeing what is there. And we have a classic case of this now, in the refusal to register in their minds what many Egyptologists and others must have read, namely that there was once a vertical shaft in the Sphinx that led to a subterranean chamber beneath the haunches. By some weird unspoken consensus, everyone has agreed *not to know this*.

So where do we stand? We know precisely where the vertical shaft was. We have exact measurements of its location. We know the exact dimensions of the opening. We know the nature of the chamber. We know that it contained an ancient burial. We know that the walls were inscribed with hieroglyphics. Not

only could these reveal whose burial was in the chamber, but presumably some pieces of the coffin boards are still in the chamber and could be carbon-dated.

It is possible that the cement that Baraize smeared into the crack in the haunches and stuffed into those portions of the shaft that were accessible has not filled the chamber. There must have been a great deal of sand filling the chamber and much of the shaft, and this would have protected the rock from damage caused by the cement. The chamber could thus be reopened. Probably the whole chamber and much of the shaft itself are intact underneath the restoration of Baraize. The evidence that I have presented is overwhelming. There is no doubt that crucial information about the Sphinx could be recovered if we could reopen the shaft and chamber somehow. But how could we do it without damaging the Sphinx? The Sphinx is a proud symbol of the modern nation of Egypt. It has been laboriously restored in recent years and is one of the main tourist attractions of Egypt. Although the authorities did not hesitate to cover it with scaffolding for years, and equally do not hesitate to shut major sites like the interior of the Great Pyramid for a year or more at a time for restoration, the question arises: Would anyone be prepared to try to enter the shaft and chamber now that the Sphinx is meant to be completely perfect and fully restored? If they aren't prepared to break through Baraize's cement at the upper end of the ascending rump tunnel, which could be done from inside without anybody seeing anything, will they be willing to undertake more drastic investigation on the outside? There are more than archaeological considerations involved. This is really a political and prestige issue. The Sphinx is a political symbol today, representing the glory of the nation.

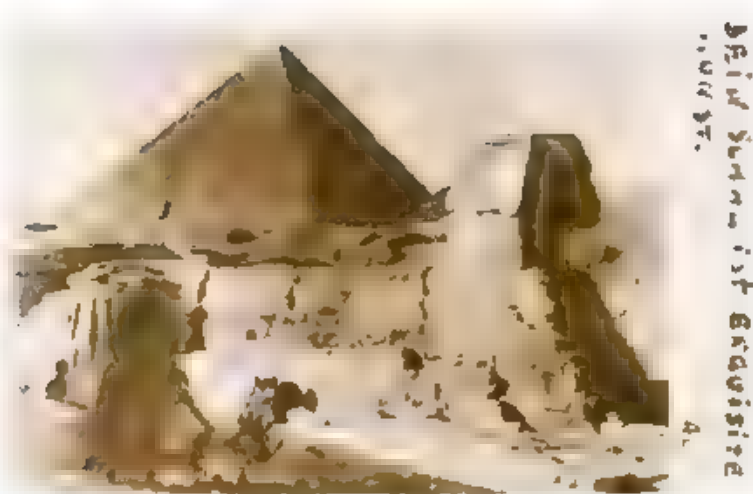


Figure 2 19 This postcard, mailed from Port Said to Germany in 1929, shows the Sphinx at a crucial transitional stage. Baraize has obviously finished his clearance in 1926, but has not yet erected his scaffolding or commenced his violent "restoration." The deep crack of the detached rump and the crack near the front of the body are evident. There is also a crack in the middle of the body that can be seen here. Old restoration stones, presumably of New Kingdom (post-Thutmose IV), Ptolemaic, and Roman date, have fallen off the side of the Sphinx and are temporarily piled up close beside it. These were later cemented back into place by Baraize, though he obviously had to guess at their placing, since he was drawing them from a heap. The ravaged core of the Sphinx's side may be seen here in a largely bare state, though along the lower half more ancient repair blocks (presumably of Old Kingdom date) of larger size can be made out, which are still adhering and are of superior workmanship. This shows that older repair blocks from previous epochs underlie many of the historical repair blocks visible on the surface of the Sphinx's body today, many of which in turn are covered by recent ones. This observation agrees with the clear "double-skin" of restoration shown on the Sphinx's rump in figure 5.14. When trying to estimate the original width and contours of the Sphinx's sides, we must remember that two or even three later skins exist for most of the surface, along with cement in-fillings and countless "patches," and that all these have been shaped according to the opinions of the restorers, creating contours that met with their approval at various epochs. (*Collection of Robert Temple*)

It is also a nice little earner for the tourist business. And Egypt certainly needs its tourists as it struggles economically.



But on the other hand, the Egyptian authorities have to weigh the advantages of making a discovery of a truly sensational nature. They know enough about international publicity to realize that if they were to open and study and photograph a chamber beneath the Sphinx and decipher and publish the hieroglyphic inscriptions on its walls, and possibly even date a coffin board, they would cause so much excitement that the result could easily be a doubling or even a trebling of the number of foreign tourists suddenly rushing to Giza, and the Egyptian economy could benefit by many tens of millions of extra dollars per year.

So what will they do?

Finally, I must mention again that in more recent times, there has been some scientific survey evidence carried out to try to find underground passages and chambers beneath the Sphinx. The work that has taken place commenced in the 1970s. Results of these first studies were published in 1977 in a booklet entitled *Applications of Modern Sensing Techniques to Egyptology*.<sup>48</sup> In this booklet, the authors write that preliminary work in 1974 showed that the use of radar was ineffective in searching for underground chambers and tunnels: "The fact that radar cannot answer these questions was discouraging to us after our 1974 work; however, the present results using acoustic methods and resistivity [measurement of resistance to the flow of electricity] methods reopen many possibilities for further, efficient surveying of Giza."<sup>49</sup>

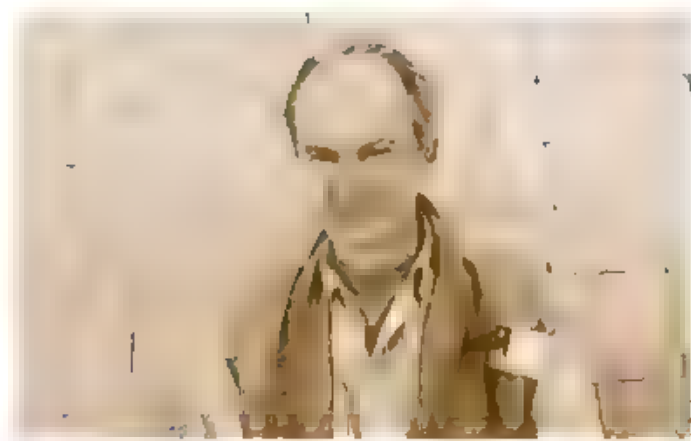


Figure 2 20 Here I am standing in front of a paw of the Sphinx, but you would never know it, because the myriad of tiny limestone blocks behind me are all brand-new. This type of "restoration" of the Sphinx was done not for archaeological purposes but to render a national monument fit for viewing by millions of tourists, as customers of the Egyptian economy and as "consumers" of the Sphinx. There is certainly no reason to believe that this restoration of the forelegs and paws of the Sphinx accurately reflects their original appearance, or that the earlier restoration of the forelegs and paws by the Romans (who also used small limestone blocks) was accurate either. In this photo I am wearing my badge as a delegate to the Eighth International Congress of Egyptologists, which took place in Cairo in 2000, at which time I made one of my visits to the Sphinx Pit. (Photo by Olivia Temple)

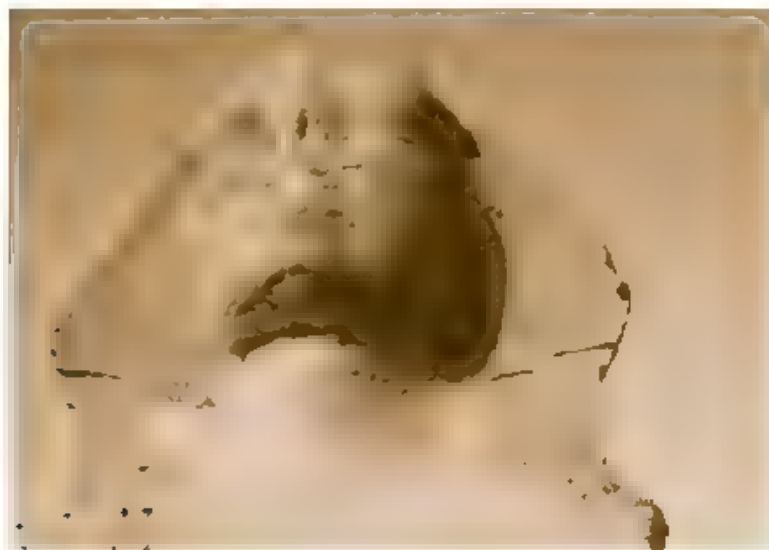




Figure 2.21. I took this view of the Sphinx's head from its feet, shortly after sunrise. It shows several features very clearly that are not readily visible to tourists, who are not allowed this close except with special permission. The lappets, or side flaps, of the headdress have been "reconstituted" since the 1930s. Blocks of concrete have been placed under them, so that at a distance it looks as if they are complete and extend all the way to the shoulders. In the old photos shown in figures 1.5 to 1.7, 1.16, 1.17, and 1.20 to 1.22, it is very clear that until this was done, the lappets were in tatters and the bottoms of them no longer existed at all. Another feature clearly shown here is that the neck has been entirely reconstituted by "reconstruction" in the most barbaric and primitive fashion. It now consists merely of layer upon layer of modern cement smeared roughly, and not even smoothly to give some kind of approximate impression of a neck, which is not shaped with any care. The nose was broken off by a Muslim fanatic in the tenth century, not shot off by Napoleon's soldiers as the false story goes. You can see that various fissures in the face (which are clearly visible in the old photos in figures 1.16, 1.17, and 1.21) have been filled in with modern cement. The other repairs may be seen very clearly by comparing this photo with figure 1.22. From the evidence, it is clear that the Sphinx today is an absolute mess, a botched job of appallingly bad reconstruction, such that the grand monument has been turned into a kind of Disneyland parody of itself. I hope that one day a restoration of the Sphinx can take place that will lend the dignity and taste to the monument that these ugly disfigurements have gone so far to destroy. However, it will not be easy, because the modern cement and concrete are hard and the native stone is fragile. (Photo by Robert Temple)



Figure 2.22. This is a close-up of limestone repair blocks on the Sphinx, which are generally believed to date from the Old Kingdom. (The pale one at top left is a modern replacement block.) I should point out certain details about these blocks. One is that several of the blocks are cut with interlock niches to grip blocks higher up and to one side, as we see with two successive blocks at bottom left in the photo, for instance, they are not cut as simple rectangles but can grip above with their little niches. This technique was often used with large blocks during the Old Kingdom (as can be seen in many places in the adjoining Valley Temple) and indicates a definite finesse in building techniques. Some of the blocks, especially at the bottom of the photo, have negligible mortar and fit together extremely tightly, as one would expect of Old Kingdom blocks. To have achieved this while covering a curved surface at the same time is a considerable feat and shows superior skill, skill that did not exist after the Old Kingdom. On the other hand, the higher courses of stone shown here have substantial mortar, which has clearly been inserted later on. I believe that the blocks in the upper half of the photo have all been retrieved and relaid after having fallen to the ground. This may have taken place at any time from the Middle Kingdom to Roman times. The mortar appears to be so crude that it has probably also been repointed, possibly even by Baraize or Selim Hassan as recently as the 1920s or 1930s. The point of all this is that large portions of the rear of the Sphinx are still covered in these superior blocks of apparent Old Kingdom origin, and they were obviously placed there to cover erosion of the stone body of the Sphinx. But if this is the case, how can the Sphinx have been carved in the Old Kingdom? There is a clear contradiction here: the Sphinx is said to have been carved on the orders of either Cheops or Chephren, of the Fourth Dynasty of the Old Kingdom, and yet repair blocks dating from about that time seem to survive on the Sphinx. How is that? Do you normally repair something that you have just made? The Inventory Stela (see figures 3.5 to 3.8) excavated at Giza states that Cheops *repaired* the Sphinx. Although the Inventory Stela is a late stela that does not date from the Old Kingdom, some have suggested that portions of it repeat an older text from an earlier inscription. The popular idea that the Sphinx is thousands of years older than Cheops is absurd and cannot possibly be true (and I show in this book in chapter 6 why the "ancient rain" theory is false), but it is possible that the Sphinx is older than the time of Cheops by as much as several centuries. And that poses even more difficult problems for the origin of Egyptian high civilization, because then we are dealing with a real problem rather than a fantasy problem, and reality is always tougher to handle than fantasy. The idea that the Sphinx is of immense and fantastic antiquity is as remote and unreal as a hedge fund, whereas the fact that the Sphinx was repaired at the same time that it was supposed to have been carved is as real and difficult to handle as your own personal bank account. (Photo by Robert Temple) Opposite top. Figure 2.24. This photo of the Sphinx's right hind paw shows clearly how artificial it is and reveals the many layers of repair blocks. The pale small blocks are the new ones, made of freshly cut limestone and placed there in recent years to create a coherent tourist attraction that "looks right" from a distance. The protruding element behind the paw is the Sphinx's tail, which, as can be seen, consists now entirely of reconstruction blocks dating from different periods (the pale ones being the recent ones). To the right of the tail, and in the center of the photo above the paw, is the former giant crack in the Sphinx's body that can be seen so clearly in the 1921 photo shown in figure 1.31, before it was filled. In 1926, Baraize filled the crack by pouring in tons of cement and then covered over the cement with small limestone blocks (see at the top of this photo in the central portion). Below those, just above the paw, are a few courses of what appear to be older repair blocks, and to the left of them recent ones that are almost white, which have been stuffed in where some holes had begun to reappear since the 1920s. Those blocks to the left of the tail in this photo, which are large and worn, are thought to date from the



Figure 2.23. A close-up view of the left lappet of the headdress of the Sphinx. The bottom half of the lappet consists of a complex series of small restoration blocks, with a thin layer of slabs over them, followed by modern concrete up to the level of the original top half of the lappet. The effect from a distance is to make the lappet appear to be complete (Photo by Robert Temple)



Figure 2.24. This photo of the Sphinx's right hind paw shows clearly how artificial it is and reveals the many layers of repair blocks. The pale small blocks are the new ones, made of freshly cut limestone and placed there in recent years to create a coherent tourist attraction that "looks right" from a distance. The protruding element behind the paw is the Sphinx's tail, which, as can be seen, consists now entirely of reconstruction blocks dating from different periods (the pale ones being the recent ones). To the right of the tail, and in the center of the photo above the paw, is the former giant crack in the Sphinx's body that can be seen so clearly in the 1921 photo shown in figure 1.31, before it was filled. In 1926, Baraize filled the crack by pouring in tons of cement and then covered over the cement with small limestone blocks (see at the top of this photo in the central portion). Below those, just above the paw, are a few courses of what appear to be older repair blocks, and to the left of them recent ones that are almost white, which have been stuffed in where some holes had begun to reappear since the 1920s. Those blocks to the left of the tail in this photo, which are large and worn, are thought to date from the Old Kingdom repairs. The small dark blocks at top right in this photo are probably Roman.

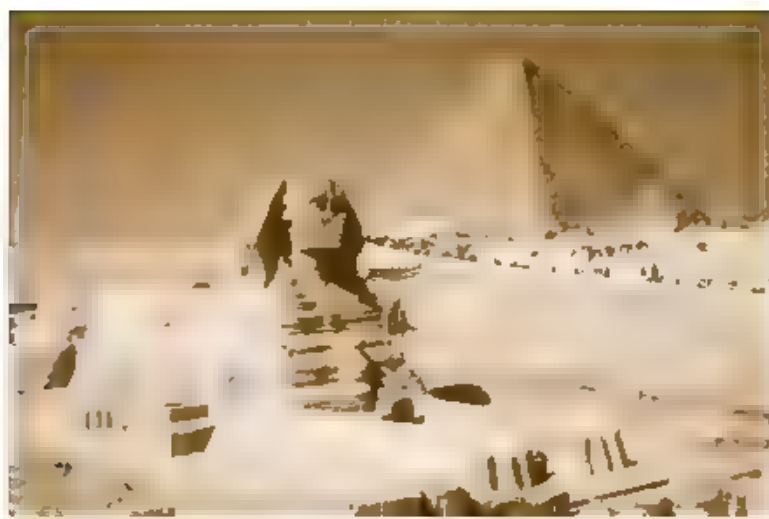


Figure 2.25 The Sphinx as seen from the roof of the Valley Temple, with the Great Pyramid in the distance. At the Sphinx's feet is the modern wooden ramp that has been constructed to lead select visitors into the Sphinx Pit (it is closed to normal tourists). The long legs and the paws are entirely a work of restoration, small modern limestone blocks having supplemented the Roman ones. Even two thousand years ago, the legs and paws were so worn away that they had to be entirely rebuilt. The outer casing of the rear paw has been similarly reconstructed by modern blocks. The main purpose of the Sphinx today is to act as a national monument and to service the tourist industry. I have never seen a photo of the Sphinx from this viewpoint published before, since no one is normally allowed onto the roof of the Valley Temple. (Photo by Robert Temple)

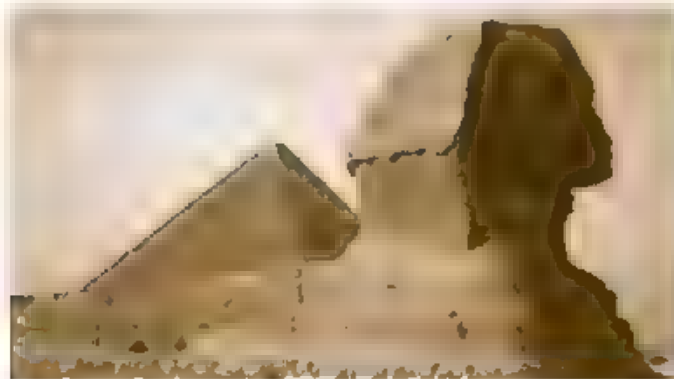


Figure 2.26 A brooding Sphinx. (Photo by Robert Temple)



Figure 2.27 A photo of the Sphinx taken from inside the Sphinx Temple, which is closed to tourists. The remains of the uraeus (insignia of a royal serpent rearing its head) on the forehead of the Sphinx is seen particularly clearly from here, whereas it is usually hard to see it properly. The west wall of the Sphinx Temple, which faced the feet of the Sphinx, formed an eastern barrier for the water in the Sphinx moat during the Old Kingdom period. By no later than 2000 BC, the Sphinx Temple was entirely buried

in sand and forgotten and was only discovered unexpectedly in the 1930s by Selim Hassan (*Photo by Robert Temple*)



Figure 2.28 This rear right foot of the Sphinx is heavily restored by small, modern limestone blocks to make the monument presentable for tourists (*Photo by Robert Temple*)



Figure 2.29 The filled-in waist on the right (southern) side of the Sphinx. The top half of the Sphinx's body seen in this photo is the original carved stone figure, deeply eroded in a series of horizontal stripes, whereas the bottom half is composed entirely of reconstruction blocks from different periods. These have had the effect of filling in the waist of the Sphinx, which was once narrow, thus disguising the doglike appearance and making the body appear to be more massive and leonine. At the left of the photo, the angle of the light on the tail enables us to see clearly that this portion of the tail at least is made entirely of blocks, and does not contain any carved stone core at all. The tail may therefore not be an original feature of the Sphinx but could have been added at a later period as part of a "lionizing" process. In any case, if there were an original tail, what we have now is largely or wholly a replacement, or "tail transplant." (*Photo by Robert Temple*)



Figure 2.30. At dusk, when the glare of the sun has subsided, a clearer view is possible of the contrasting materials that now make up the outer surface of the "restored" Sphinx. Here we see that the elbow of the Sphinx is entirely covered in small modern



limestone restoration blocks. The chest is the original weathered bedrock. The bottom half of the headress down to the neck is of modern blocks and concrete, smeared with modern cement. (Photo by Robert Temple)

They then published a very brief summary of attempts to search for underground chambers and tunnels in the Sphinx precinct. They write that they found “five areas of interest.” They believed they detected cavities in front of the forepaws of the Sphinx and also, as quoted in the preceding chapter:

Behind the rear paws (*northwest end*) we ran two traverses . . . Both traverses indicate an anomaly that could possibly be due to a tunnel aligned northwest to southeast.

Another anomaly exists in the middle of the south side near a square cupola added apparently in Roman times. This anomaly was verified by two overlapping traverses. . . . When the electrodes were moved 2 m away from the previous traverse, the anomaly decreased in value. This is typical of the behavior expected from a vertical shaft. . . . The resistivity anomalies we found around the Sphinx are not defined sufficiently to allow us any absolutely certain conclusions, and we feel that a more detailed survey should be conducted.<sup>50</sup>

These results were certainly suggestive, and at least two of the findings could well have been shafts or tunnels linked or connected to the vertical shaft in the haunches and the chamber beneath it, which of course were unknown to these researchers, an Egyptian physicist named Ali Helmi Moussa and an American physicist named Lambert Dolphin from the Radio Physics Laboratory of the Stanford Research Institute in California.

What is of particular interest is their finding that there appeared to be “an anomaly” that was “behind the rear paws” and that “could possibly be due to a tunnel aligned northwest to southeast.” This anomaly falls along a crack in the bedrock that does indeed run northwest to southeast, and that is clearly portrayed in the plan drawn by my friend Professor Lal Gauri, which is reproduced here as figure 1.30 and shows the Sphinx from above looking down. Of this, Lal says: “Dissolution of the limestone by water along the joints has produced cavities . . . The shaft passing through the middle of the Sphinx as seen from above is one such large cavity. . . . Since these cavities strictly follow the joint patterns [of the limestone bedrock] and are, in most cases, not connected to the surface, it seems that they have been formed by underground water.”<sup>51</sup>

The limestone bedrock of the entire Giza Plateau is unquestionably riddled with cavities. However, it should be noted from Lal Gauri’s drawing that this particular cavity beneath the Sphinx runs horizontally below the surface straight through the former vertical shaft, Baraize’s cement plugging of which may also be seen clearly on Lal’s plan as a distinct blob with a dot in the middle. It is as if the bedrock had been cracked at this weak point by some enormous force applied to it, and it may well be that the crack occurred along the joint when the vertical shaft was intruded downward into the bedrock beneath the Sphinx for the construction of the burial chamber, which lay precisely in the path of this extended linear “cavity.” Subsequently, the action of water may well have scoured out the crack to form a long hollow space, for once a crack opens in limestone, water is bound to wear it away even further over time. And one of the descriptions of the tomb chamber did mention, as we have seen earlier, that it was an enlarged natural cavity.

A second depiction of the linear crack/cavity is shown in another plan, published by Mark Lehner in the same volume of conference proceedings as the one by Lal Gauri.<sup>52</sup> This drawing is reproduced here in appendix 5 as figure 10 and confirms the drawing of Gauri, although it does not show any cracking on the northwest side of the Sphinx at all, and Lehner seems to have been unaware of it. What Lehner does show

is the cracking that runs in a direction southeast from the Sphinx's right rear paw, which Lehner describes as a "Major Fissure."

Thus, we have clear evidence from the plans published by two of the leading experts on the Sphinx that there is a major crack in the bedrock commencing at the point of the former vertical shaft in the haunches of the Sphinx, and this is the same feature reported by Moussa and Lambert in 1977. It is possible that this feature is not merely a crack, fissure, or cavity enlarged by water, but is an actual tunnel leading from the burial chamber. Why not? If they put a chamber down there that was as large as the accounts inform us, then why not a tunnel as well? That our informants do not mention such a tunnel might merely indicate that the tunnel entrance from inside the chamber was concealed, and they did not notice it. Certainly, at the very least, further soundings need to be taken here. If they suggest that the "cavity" is a tunnel, then breaking down into it would lead to the burial chamber without the need for digging out Baraize's cement and going down from the top of the Sphinx's back.

Another thing we need to take seriously is the "cupola" attached to the south side of the Sphinx (see figures 2.31 to 2.33). People just accept this; no one questions it. Why? Is it not the oddest thing imaginable? Ancient sculptures do not normally have cupolas on them, like some kind of huge boil. What on Earth is this weird cupola? Why does no one ever challenge it and point out that it is an unacceptable anomaly? Why has no one taken the trouble to find out what is either behind or under it? Could it have been erected with an intention to conceal something or to act as an entrance to something?

Alternatively, it may have been meant to support the mysterious "statue of Osiris in 28 pieces" that was mentioned earlier by Mariette and has now disappeared. We must presume that whoever the people were who built the cupola were not just harmless cupola-lovers who simply went around building stone cupolas for fun and without a reason. So what was the reason? Why has no one ever even thought of investigating it? There is also a mini-cupola, which everyone also just blandly accepts (see figure 2.34). But *what was it?* In fact, there are altogether *four* cupolas!

In 1978, further studies were carried out at the Sphinx to follow up the intriguing results published in 1977. This work was apparently done by Lambert Dolphin, Patti Burns, and John Tanzi of the Stanford Research Institute. However, they never published their results, and in 1999 Lambert Dolphin is reported to have stated, "None of us has been able to locate our logs and printouts," even though "the 1978 resistivity work was much more thorough [than that published in 1977]." These comments are published in the book *Secret Chamber* by Robert Bauval and Simon Cox.<sup>53</sup> Bauval and Cox reveal that Lambert Dolphin's work was connected with an organization called the Association for Research and Enlightenment (ARE) in Virginia, which is devoted to researching the prophecies of the psychic Edgar Cayce. Dolphin is also quoted as writing, "Hugh Lynn Cayce [son of Edgar Cayce] was a very gracious sponsor and spent considerable time with us during the time the field work was being done. He mentioned that the Cayce Foundation had less confidence in Edgar Cayce's readings [psychic readings] in archaeology as compared to his medical readings and healing work. Yet ARE had ongoing interest in and around the Sphinx. Ongoing work has in fact continued by Dr Joseph Jahoda."<sup>54</sup>



Figure 2.31. This is the larger stone "cupola" or "booth" beside the right elbow of the Sphinx, on the southern side. What is it? No one knows. It seems to date from Roman times and may have been a base for a statue (in which case the top is missing), or a side altar base, or to conceal an entrance to the interior of the Sphinx. There are four of these bizarre protrusions from the side of the Sphinx, none of which has been explained. (Photo by Robert Temple)



Figure 2.32. Detail of the larger "south booth" or "south cupola" beside the Sphinx. (Photo by Robert Temple)



Figure 2.33. The top section of the large "south booth" beside the Sphinx. This is a very strange thing to be sticking out of the Sphinx, but no one ever mentions it. (Photo by Robert Temple)





Figure 2.34. One of the four strange stone boxes protruding from the sides of the Sphinx at the base, presumed to have been constructed during the New Kingdom, perhaps to act as statue bases. This one is the smaller of the two that are on the south side of the Sphinx. The square stones on top at right are modern reconstruction stones, as are the small limestone pieces to the left of the box on the Sphinx's body. No one has any idea as to whether the four boxes sticking out of the sides of the Sphinx at the base might have been constructed to obscure an entrance into the body or to block an entrance to a shaft. Nor has any proper study of the four boxes ever been done, to my knowledge. None of the excavators ever paid much attention to them. It seems extraordinary to me that people just seem to accept the fact that there are four stone boxes protruding from the Sphinx. You would think that archaeologists would be rushing to examine them, study them meticulously, perhaps dismantle at least one and put it back together again (which would not be difficult), just in case there is something hidden inside. But no, nobody does anything. They just sit there and everybody ignores them. No one has even inserted any probes to see if they are hollow, as far as I know. Whoever said that human beings are curious? (Photo by Robert Temple)

Apparently, the famous American psychic Edgar Cayce had had a vision while in a trance in 1923 that there were tunnels and chambers under the Sphinx. And that is why his son, the Cayce Foundation, and ARE were endeavoring to find them. Cayce said that this chamber would be what has come to be called "a Hall of Records," containing precious ancient documents about a lost civilization. The Cayce people were strongly supported by their friend of many years, the American Egyptologist Mark Lehner, whose first book, *Egyptian Heritage: Based on the Edgar Cayce Readings*, was a defense of Cayce's theories and psychic readings about the Sphinx and theories of Atlantis that was actually published by ARE.<sup>55</sup> In later work, the Cayce people drilled a hole under the right forepaw of the Sphinx and appear to have found some evidence of a cavity in the rock at that point. But the work was stopped for reasons that are disputed. A strange account of these murky doings has been published in *Secret Chamber*,<sup>56</sup> which is so confused that no matter how many times I read it, I cannot fully comprehend it, so convoluted is the whole issue.

Knowing none of the people concerned, I cannot understand why an organization in America would send a team to study something in Egypt (the expedition of 1978) and then lose the results. Does this strike anyone as odd? We are simply told (assuming the report of Bauval and Cox to be accurate): "None of us has been able to locate our logs and printouts." How many of "us" are there? How many logs, how many printouts, where were they kept? And if there were several of them, how could they *all* vanish when in the apparent custody of "all of us"? I don't get it.

A seismographer named Thomas Dobecki in 1990–1 used some seismic equipment to look for cavities underneath the Sphinx area. He says he confirmed a rectangular cavity measuring 29.5 feet by 39.4 feet under the right paw of the Sphinx.<sup>57</sup> It would be interesting to investigate that further, especially as it could possibly be a further chamber reached from the small chamber between the Sphinx's paws, seen in figure 1.29. As I said earlier, it appears from comments made by Count de Forbin that Henry Salt blocked up a passage leading from the small chamber, and if so, it might well have led to just such a large chamber as the one claimed by Thomas Dobecki. I believe that this was the same location "sensed" by Edgar



Cayce. There is no a priori reason whatever why such a chamber should be assumed not to exist, even if it is only one of the natural caverns in the limestone with which the plateau is riddled.

One thing is for sure: none of the researchers of recent decades is aware of any of the material that I have presented in this chapter, so they have all been working in the dark.

There is a chamber, there is a shaft, both of which were discussed for 281 years in a whole series of publications, *but they don't know it!*

### 3

## AN AMAZING SURVIVAL

It seems hardly credible that a story could be accurately passed from mouth to mouth for three thousand years, or seventy-five human generations. Anyone who has played the game of Chinese Whispers knows that messages get distorted incredibly quickly, and often very drastically. Chinese Whispers, for those too addicted to television and computer screens to know what it is like for a group of people to amuse themselves by playing what used to be called a “parlor game” in the days when there was still something called “social life,” consists of several people sitting on chairs arranged in a circle, facing one another; the person who starts whispers a message in the ear of the person next to him or her, and this message is repeated around the entire circle of people. Finally, the last person in the circle, who is sitting next to the person who started it all, speaks out loud the message as he or she received it. The results are usually astonishing and bizarre. Suddenly all one’s friends, who one assumed were highly intelligent and capable people, strike one as thickheaded or, possibly, perverse. “That wasn’t what I said!” one is tempted to shout. The distortions of the message are usually so incredible that everyone has a good laugh at the result, at the same time realizing the extreme fragility of messages, which can be changed beyond recognition after just a few repetitions.

This is called “noise in the system.” All messages get distorted. Nothing can be transmitted reliably if it is repeated too often, sometimes it has to be repeated only once to go awry. All of us have had the experience of a friend attributing statements to us that we have never made. Celebrities are frequently misquoted in the press, often on purpose, but sometimes just through garbling. “Noise” interrupting accurate communication even takes place within our own heads. It is called false memory syndrome. Sometimes we get things wrong but don’t realize it ourselves, and really *believe* a false message. Or for emotional reasons we may be in denial and unwilling to face a truth, so we distort the message to ourselves. We say: “I never did that,” even though we know we did, but by insisting to ourselves that we didn’t, we come to believe it. Or we distort what we have said to cast ourselves in a more favorable light.

So when we come across incontrovertible evidence that a tale has been passed down through seventy-five generations and has retained essential accuracy, it is an event in the history of folklore that really deserves to be toasted in champagne. And that is what has happened with the Sphinx.

It was the fifteenth-century Dutch traveler Joos van Ghistele who recorded this fact, although he had no idea of the true significance of what he was recording, because it was only in the nineteenth century that the evidence came to light to prove that his information was accurate.

Here is what van Ghistele set down of the tale told to him about the Sphinx by the local inhabitants of

Giza He was given this information in AD 1482, ten years before Columbus discovered America:

One day in those [ancient Egyptian] times a man went there to make some sacrifices; he asked of the Idol [the Sphinx] what was going to happen to him, and the head [of the Sphinx] replied to him that he would become King and master of Egypt if he wanted to follow its counsels. Thereupon the man replied that he would follow them and it happened that this man became King of Egypt as he had been told he would by the head. A little while after his coronation he returned to the place where the head was. [The full passage and reference are to be found in part 2.]

Let us keep firmly fixed in our minds that van Ghistele was told this by the locals in AD 1482. No later visitor was told this, and it is likely that van Ghistele arrived at Giza just as this tradition was at last dying out. Perhaps he overlapped with the last generation to remember the tale. But if so, it was a lucky fact that he did. By a hair's breadth the information was preserved just as the candle flickered and died.

What is the significance of this folktale? Of course, it is very clever of the locals to know that people went to offer sacrifices to the Sphinx, since we know from the excavations that have taken place between 1817 and 1970 of the vast amount of evidence that has been uncovered showing that the Sphinx was an object of veneration, to which kings as well as commoners made offerings, from New Kingdom times (circa 1800 BC) through Roman times. But a general tradition like that is not so surprising a thing for the locals to remember, and the end of Roman worship was only about a thousand years prior to van Ghistele's visit, so it was like people at Hastings saying today that William the Conqueror landed there in AD 1066. People at Hastings talking about William the Conqueror is one thing, but it would be quite another if we had the local inhabitants of Wiltshire giving us accurate accounts of what went on at Stonehenge when the trilithons were erected there, and what King So-and-so said and did about it, for that would be more than three thousand years ago, surely too long a time for any folklore to last! Or is it?

This is what is so extraordinary. The people of Giza remembered and accurately recounted a true story about a king named Thutmosis (also known as Thothmes) IV, who lived *three thousand years earlier than Joos van Ghistele's visit*.

"Well," you might say, "someone told them." Or perhaps "they learned it from books." But alas for the skeptical turn of mind, there is no way out. It cannot be avoided that the tale survived accurately for three thousand years by word of mouth, because the stela recording the story was not excavated until 1817 and could not be read until after Champollion deciphered hieroglyphics in 1821.

So it was 339 years after Joos van Ghistele was told the story about the Sphinx before the excavated evidence could even have been read by anyone, even if Champollion had made it the first text for translation, which of course he did not. There were no other records of the story in existence.

The discovery of the story in hieroglyphic form took place in 1817, when Captain Giambattista Caviglia thoroughly excavated the front of the Sphinx and found a large and impressive inscribed stone stela standing in front of the Sphinx's chest, placed there by the pharaoh of the New Kingdom period named Thutmosis (or Thothmes) IV (reigned 1425–1417 BC). Caviglia's excavation of this stela has already been discussed in the previous chapter. The news of Caviglia's discovery was first reported to the world in a trimonthly intellectual news magazine of the time called the *Quarterly Review*, published in London. In volume 19 for the year 1818, an account of the Sphinx excavations appeared in the context of a review of a new book of papers from the collection of Robert Walpole dealing with certain other discoveries in Egypt. The information was forwarded to the *Quarterly Review* from Cairo by Henry Salt, the British consul general in Egypt, whose action in sealing and suppressing some entrances and passages

at the Sphinx has already been alluded to.

Captain Caviglia was a very self-effacing character who liked to say modestly that he was merely a sea captain, but he worked harder and more passionately to excavate and discover things in Egypt at that time than any scholar. (Egyptologists as such did not yet exist, so there were no professionals in existence to be jealous of him and try to stop him.) Caviglia seems to have spoken English passably well, as he had sailed under the British flag in a merchant capacity for many years. But he did not write English. He could write letters in French, some of which survive (and one about the Sphinx I have copied from the manuscript and reproduced in full, in translation, in part 2), but his reports were all written in Italian and handed to Henry Salt. Caviglia quaintly called Henry Salt “Enrico,” which is the Italian form of Henry. I have looked through these reports, which are preserved in the Manuscripts Collections of the British Library among the Salt Papers. They are written in a very courtly and polite manner characteristic even then of a very old-fashioned type of man. Caviglia was legally entitled under the terms of his agreement with the Egyptian authorities to keep everything that he found in the course of his extensive excavations of the Sphinx, but he very generously retained nothing. He donated everything to the British Museum as a token of thanks to the British people under whose flag he had sailed for so long. This is why the British Museum today has a part of the Sphinx’s beard, among countless other things. Unfortunately, most or all of these items have languished in the basement since they reached London 180 years ago. The fragment of the Sphinx’s beard has occasionally been a subject of dispute, with people pointing out that it should be returned to the Sphinx, especially as another fragment is in Cairo. But people who say this do not know the facts. The beard was affixed to the Sphinx by the very pharaoh of the New Kingdom whose story we will shortly narrate. It was never part of the original Sphinx, and to “return it to the Sphinx” would be ridiculous. It would make sense to join the two beard fragments, of course, which is another matter. But even when you had done that, there wouldn’t be much to see. If you’ve seen one Egyptian beard, you’ve seen them all. The Cairo fragments of the Sphinx’s beard are pictured in figures 3.1 and 3.2; the latter shows that the fragments that remained in Cairo were smashed, and only portions are left.

Since Caviglia could not write in English, he left the English publication of his exploits to Salt, which is why everything is in the third person, and there is no first-person narrative available in English about what Caviglia actually did. I wish Caviglia’s original accounts could be found and then translated from Italian into English and published, as they should form a part of the official printed record of the history of Egyptology. My friend Stefano Greco and I have done this for a previously unknown third-person account of Caviglia’s excavations privately printed in Italy at the time by Caviglia’s friend Annibale Brandi, of which only one copy appears to survive, and Stefano found it. The section of this booklet dealing with the Sphinx, translated into English, is in appendix 4.

In the *Quarterly Review* account, even Henry Salt is referred to in the third person—“Mr. Salt says”—indicating that someone else took the documents forwarded by Salt and edited them, incorporating comments from Salt’s letters, who evidently stayed in Cairo while this was all being prepared for publication in London.<sup>1</sup>





Figure 3.1. These are fragments of the Sphinx's beard that were excavated by Giambattista Caviglia in 1817 and drawn by Henry Salt at the time. It can readily be seen that this beard was a New Kingdom addition to the Sphinx and that it bore hieroglyphics and pictures, which was completely different from the style of the Old Kingdom period. The plaited pattern is meant to represent the plaited hair of the beard. The top portions show a New Kingdom pharaoh, doubtless meant to represent Thutmose IV, kneeling and making an offering. The hieroglyph *ankh* is seen at top left, although it is broken off at the bottom. This portion of the fragmentary inscription, continued in the second fragment, ends in the letter *f*. The third fragment shows what is presumably the pharaoh facing the other way with an offering. To his right are two scepters. The one on the right (with a break in the middle) is known as the *was* scepter, as can be seen by its forked base, which was used in shadow-measuring. This drawing is found in *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Perring, London, 1842, third appendix volume. (Collection of Robert Temple)

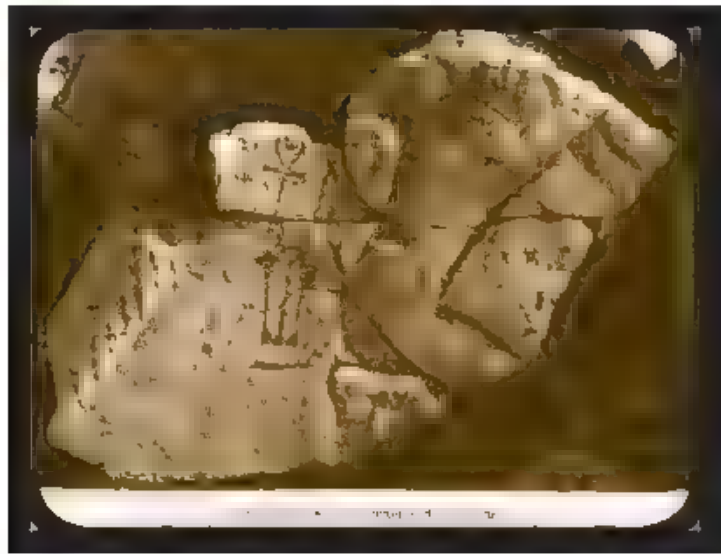


Figure 3.2. This is a photo of portions stuck together of what was once the top fragment of the Sphinx's beard; the condition of the fragment before it was further broken by archaeologists is shown in figure 3.1 above. To the right, the kneeling pharaoh making an offering is now lacking his head, which he still possessed in 1817. Many excavated objects suffer further damage after they are found, and this is an example. The German caption says, "Fragments of the divine beard of the Sphinx." This is reproduced from plate 17 of Herbert Ricke's *Der Harmachistempel des Chephren in Gizeh* (*The Harmachis Temple of Chephren at Giza*) Wiesbaden, 1970. These fragments are in the Egyptian Museum in Cairo.

Figures 3.3 and 3.4 show the engraving published in this report in the *Quarterly Review*,<sup>2</sup> done from a drawing by Henry Salt (or someone commissioned by him), and sent by him to London for reproduction. It shows the layout of the altar and place of worship that existed between the paws of the Sphinx in Roman

times, as discovered by Caviglia. In the foreground is a “four-horned” altar. But the Romans and the Ptolemies before them had retained as the central feature, at the very back, the great stela of Thutmosis IV with its inscription and its picture of two sphinxes perched on pedestals, to whom the pharaoh is making offerings. The stela is 14 feet high and is carved in granite. The photo I took of this stela, which is still *in situ* at the Sphinx, is in figure 3.8, figure 3.5 is an older black-and-white full photograph. Salt’s drawing of it is reproduced in figure 3.7. These should all be compared.

In the year following the *Quarterly Review* account, an account of Caviglia’s work in Egypt was published in Scotland in *The Edinburgh Philosophical Journal*, which contained no illustrations but did have these interesting remarks about the Sphinx:

The French savants appear to have done nothing more than uncover the back of this stupendous piece of sculpture; and, if they attempted any other excavations, cannot possibly have proceeded far in their work, as the top of the wall, which has now been discovered, is not above [i.e., not more than] three feet below the level of the sand. Mr. Caviglia . . . proceeded, therefore, to carry on his excavations in the front; and, after labouring for the space of nearly four months, with the assistance of from 60 to 100 persons every day, he succeeded in laying open the whole figure to its base.<sup>3</sup>

Here is the description given in the *Quarterly Review* of the scene as it was when excavated:

On the stone platform in front, and centrally between the outstretched paws of the Sphinx, was found a large block of granite, fourteen foot high, seven broad, and two thick. The face of this stone, which fronted [faced] the east, was highly embellished with sculpture in bas-relief, the subject representing two Sphinxes seated on pedestals, and priests [actually the pharaoh, not priests] holding out offerings, beneath which was a long inscription in hieroglyphics, most beautifully executed; and the whole design was covered at top, and protected, as it were, with the sacred globe, the serpent, and the wings [i.e., a winged solar globe].<sup>4</sup>



Figure 3.3 This engraving was published in the *Quarterly Review*, London, vol. 19, no. 38, April–July 1818, p. 416, based on a drawing sent from Egypt by Henry Salt. It shows the area between the forelegs of the Sphinx, as excavated by Caviglia the

previous year. All subsequent illustrations of this scene are copies from this one and not always as accurate. This is what the area between the paws of the Sphinx looked like at the time of the Greeks and Romans, when offerings were burned on the altar to the "god," as the Sphinx was conceived at that time. In the foreground of the engraving is the altar with the four "horns." To either side, designated by the letter "P," are the forelegs of the Sphinx. The Dream Stela, marked "A," is at the back, and still stands *in situ*. (The stelae to either side, marked "B" and "C," have been moved to museums.) The large inscription in Greek at far right, on a toe of the Sphinx, is by Arrian; it is described at length in chapter 6, where the text and translation are also given and the importance of this inscription for our ideas of the true nature of the Sphinx are discussed. This entire area was originally of New Kingdom construction, with the focus on the Dream Stela. The area was altered by the Greeks and Romans, and the altar is probably Greek. The purpose of the area was the worship of the Sphinx as the new deity Harmachis. But this had nothing to do with the original nature and purpose of the Sphinx, which had been long forgotten by the time of the New Kingdom. See figure 3.4 (below) for an explanation of each lettered detail in the drawing. One thing to notice about the drawing is that the Dream Stela's text is shown here as intact. As discussed in the main text, this text was indeed intact when found, but the bottom half was destroyed by the local people. Hieroglyphics had not yet been deciphered, so there was no way anyone could read the text before it was half-destroyed. (Collection of Robert Temple)

- The annexed sketch will convey to the reader the disposition of the ground, and the objects by which it was occupied, in front of the Sphinx and between its paws, in which
- A. Is the granite tablet, 14 feet high, 7 feet wide, and 2 feet thick.
  - B. The side tablet, still standing.
  - C. The tablet fallen, which has been sent to the British Museum.
  - D. Two small Sphinxes, supposed to have stood in these places, fragments of them having been found near.
  - E. Statue of a lion, of the best Egyptian sculpture.
  - F. Two lions of ruder sculpture supposed to stand here, being found near the spot.
  - G. The granite base of an altar.
  - H. The upper part of the altar.
  - I. Top of the altar, bearing the marks of burnt sacrifices.
  - K. The horns of the altar, one of which was found in its place.
  - L. The first digit of the Sphinx's paw.
  - M. The second.
  - O. The pavement.
  - PP. Parts of the two fore legs of the Sphinx.

Figure 3.4. Key to figure 3.3.



Figure 3.5. A full view of the front of the Dream Stela of Pharaoh Thutmose (Thothmes) IV. This is plate XL, following page 140 in Seim Hassan's book *The Great Sphinx and Its Secrets*, Cairo, 1953. A drawing of the full stela is reproduced in figure 3.7, which shows more of the text surviving than is visible here, before this photo was taken, some of it fell off and was lost. Originally, when excavated in 1817, the text was complete, but the local people tore half of it away within months

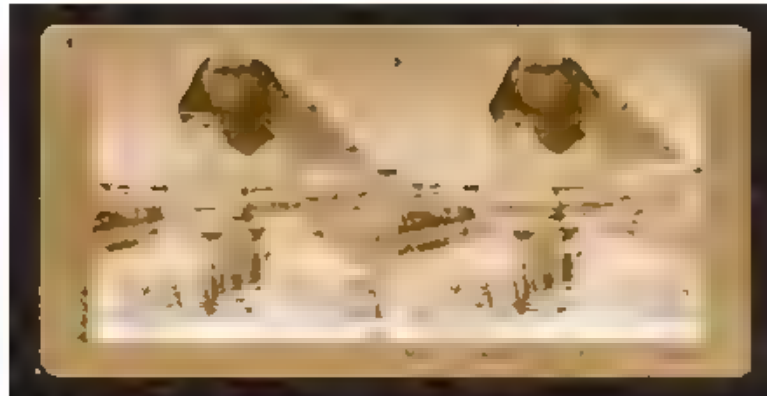


Figure 3.6 This stereoview taken between 1926 and 1936 shows the Dream Stela beneath the chin of the Sphinx and the altar area with a man standing just behind it. The two stelae that were found to either side of the Dream Stela when Caviglia made his excavations have been removed to museums (*Collection of Robert Temple*)

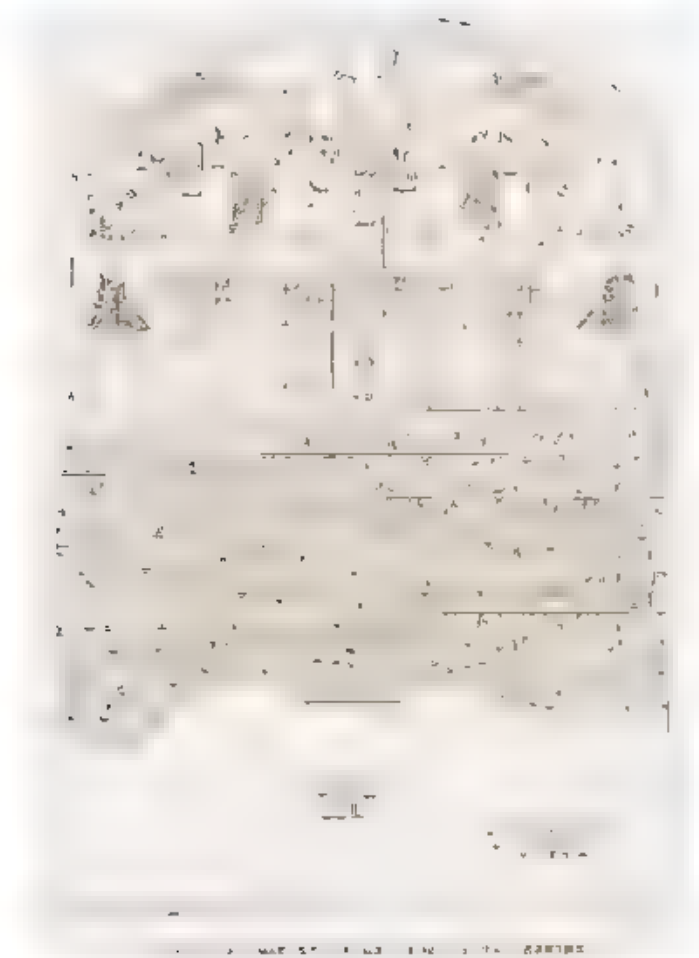


Figure 3.7 This is Henry Salt's drawing from late 1817 of what remained of the text of the Dream Stela of the New Kingdom pharaoh Thutmose (Thothmes) IV, which was found upright beneath the chest of the Sphinx and between its paws when Caviglia carried out his excavations. This drawing is found in *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Perring, London, 1842, third appendix volume plate opposite page 110 (*Collection of Robert Temple*)





Figure 3 8. The Dream Stela of the New Kingdom pharaoh Thutmose IV (reigned 1411–1397 BC), which he erected between the front paws of the Sphinx to celebrate the dream he had about it and to boast of his clearing and restoration of the monument, which had been buried up to its neck in sand until that time. The pharaoh himself is shown twice, once on the left and once on the right, making offerings to a small sphinx on a pedestal, which is a way of representing the Great Sphinx at the same scale with the king for purposes of the stela. (Photo by Robert Temple)

The report did not mention that the great stela had been placed there by Pharaoh Thutmose IV, nor was the story that the stela told recounted, because, as already noted, at that time no one could read a word of it! Hieroglyphics had not yet been deciphered. It would be another four years before Champollion made his very first translations of hieroglyphics, and we do not know exactly when this stela was finally deciphered and actually read, but it would certainly have been some years later.

Here is the key part of the text of the stela, as we can now read it:

Year I, third month of the first season, day 19, under the Majesty of Horus . . . the Son of Ra, Thothmes [Thutmose] IV, Shining in Diadems. . . . When His Majesty was a stripling, like Horus, the Youth in Khemmis, his beauty was like the Protector of His Father [a title of Horus], he seemed like the God himself. The army rejoiced because of love for him [this is very revealing, since the New Kingdom pharaohs tended to be very militaristic]. . . . Behold, he did a thing which gave him pleasure upon the highlands of the Memphite Nome [a Nome is an administrative district, the district being that of Memphis, and its highlands being the Giza Plateau], upon its southern and northern road shooting at a target with copper bolts [arrows], hunting lions and the small game of the desert, coursing in his chariot, his horses being swifter than the wind, together with two of his followers, while not a soul knew it.

Now, when his hour came for giving rest to his followers, it was always at the Setepet (Sanctuary of Hor-em-akhet [Horus-in-the-Horizon]) [the temple built beside the Sphinx by the slightly earlier pharaoh Amenhotep II, the actual Sphinx Temple itself being then unknown and completely buried in sand], beside Seker [the god Sokar] in Rostaw [this refers to what we today call the Valley Temple of Giza] . . . in the desert . . . the Splendid Place of the Beginning of Time. . . . Now, the very great statue of Kheperi [the rising sun, the name that Thothmes here gives to the Sphinx, which faces due east] rests in this place the great in power, the splendid in strength, upon which the shadow of Ra [the sun] tarries. The quarters of Memphis, and all the cities which are by him come to him, raising their hands for him in praise to his face, bearing oblations for his Ka [his animating principle, one of the Egyptian categories of “spirit”].

One of those days it came to pass that the King's [younger] son Thothmes [who was not heir to the throne] came, coursing [hunting on horseback] at the time of mid-day, and he rested in the shadow of this Great God. Sleep seized him at the hour when the sun was at its zenith [noon], and he found the Majesty of this Revered God speaking with his own mouth, as a father speaks with his son, saying: "Behold thou me, my son, Thothmes. I am thy father, Hor-em-akhet-Kheperi-Ra-Atum [Horus-in-the-Horizon—Rising Sun—Sun God—Creator God]; I will give to thee my Kingdom upon earth at the head of the living [i.e., make you the pharaoh]. Thou shalt wear the White Crown and the Red Crown [the two crowns indicating the pharaoh] upon the Throne of Geb [the god of the Earth; this was the customary phrase to describe the pharaoh's throne], the Hereditary Prince. The land shall be thine, in its length and in its breadth, that which the eye of the All-Lord shines upon. The food of the Two Lands [Upper and Lower Egypt] shall be thine, the great tribute of all countries, the duration of a long period of years. My face is directed to you, my heart is to you, Thou shalt be to me the protector of my affairs, because I am ailing in all my limbs. The sands of the Sanctuary, upon which I am, have reached me; turn to me in order to do what I desire. I know that thou art my son, my protector; behold; I am with thee, I am thy leader."

When he had finished this speech, the King's Son awoke, hearing this . . . [some lost text] . . . he understood the words of the God, he put them in his heart.<sup>5</sup>

This stela is now called by archaeologists the Dream Stela because it bears the inscription recording the pharaoh's dream.

Only after the Dream Stela had been excavated and deciphered did we know the story about the younger son of the king falling asleep at noon in the shade of the Sphinx with his two riding companions and having the dream that if he cleared the Sphinx of sand and paid it honor, it would make him king of Egypt. This story was otherwise unknown. And yet in AD 1482 it was still remembered from ancient times by the local inhabitants of Giza and told to a Dutchman!

As far as I know, this is the only conclusively proven example of an accurate continuity of oral tradition over such a fantastic amount of time. It belongs in the *Guinness Book of Records*.

Since we have had this conclusive and unexpected proof of the validity of some Giza folklore over an otherwise quite unbelievable period of time, we must take the Giza folklore as a whole much more seriously than we would otherwise be inclined to do. We must therefore examine some other claims about the Sphinx that the locals have recounted for centuries, to the amusement of visitors, who have mostly thought it was all fairy tales told to the tourists.

In part 2 of this book I have gathered a massive number of early travelers' accounts of the Sphinx, and anyone who reads through them will see several constantly recurring themes. I intend to examine several of these. But let us start with one that seems to be the most ridiculous of all: the absolute insistence by the locals that there is a direct connection between the Sphinx and the Pyramid of Chephren. Usually this takes the form of insisting that there is an underground tunnel leading from one to the other. Sometimes this tradition varies, and the underground tunnel is said to come out in the well shaft of the Great Pyramid, but that seems to be a variant tale concocted by speculation and the desire to impress European visitors when they began to go down the well shaft. After all, no opening to the Pyramid of Chephren was known until Belzoni found it early in the nineteenth century. So it was difficult when Europeans kept crawling in on their hands and knees over the mounds of sand and bat dung to explore the interior of the Great Pyramid and forcing terrified Arabs to hold ropes while they descended the well shaft, from which hordes of huge bats emerged and where candles and lamps went out, to continue to insist that the connection between the

Sphinx and the Pyramid of Chephren was so important. It was far easier to speculate that the Great Pyramid's well shaft was the point of connection. And yet there are sufficient occasions when the locals insisted on the connection with the Pyramid of Chephren, into which curious Europeans could not enter, to make it clear that this was the original tradition.



Figure 3.9. A late-nineteenth-century photo of the Giza Plateau looking northwest, when the famous centuries-old sycamore tree was still standing, and some palms as well. In the background is the Great Pyramid, and to the right of the sycamore the head of the Sphinx protrudes from the sand in the distance. At this time there were no tourists, and things were much quieter. This is very much what the Giza Plateau must have been like during the New Kingdom, when the future king Thutmose IV (who reigned 1425–1417 BC) went hunting on the plateau and fell asleep in the shade of the Sphinx's head and had his famous dream, which he inscribed upon the Dream Stela that still stands between the paws of the Sphinx. The serene timelessness of the Giza Plateau only really ceased after the Second World War, when the international tourist plague commenced. (Collection of Robert Temple)

So when I say that I have recently confirmed this folklore tale, the reader may well think that I am claiming to have crawled along a tunnel for the whole distance. But nothing of the kind! In the finest ancient Egyptian tradition, the connection that existed was of a subtle and esoteric nature that until now no one has ever suspected. The locals had obviously been told far in the distant past that such a connection existed, but not understanding its true nature, they assumed that underground tunnels were the answer. This seemed logical, especially since there were plenty of tunnels at the Sphinx that the locals could well imagine once went much farther into the plateau; they also knew that the plateau was riddled with shafts and tombs, and it was by no means illogical of them to presume that anyone who could build something the size of a pyramid could easily dig a tunnel as far as the Sphinx.

To describe the strange connection between the Sphinx and the Pyramid of Chephren I have to refer readers to my earlier book *The Crystal Sun*.<sup>6</sup> In color plate 30 of that book, the reader will see a photo of one of my major discoveries at the Giza Plateau. (I have also reproduced this photo on this book's website, [www.sphinxmystery.info](http://www.sphinxmystery.info).) It is the winter solstice sunset shadow that I discovered cast on the south face of the Great Pyramid by the adjoining Pyramid of Chephren. It had been there once a year for at least 3,500 years but no one had "seen" it until I spotted it in 1998. (It was actually not visible in 2000 because of hazy atmospheric conditions.) I noticed that this shadow had a significant slope. I measured it and discovered that the slope was identical with the slope of the Ascending and Descending Passages inside the same structure. It was therefore a hint on the outside of what was on the inside of the Great Pyramid, but only someone who already knew about such things could ever "see" it. After all, if you didn't know there were passages inside and didn't know their slope, how could you possibly know the



significance of the slope of the shadow? If you were an Egyptian architect of the Old Kingdom, you would know the angle, but ordinary folk knew nothing of this. The Egyptians seem to have enjoyed such inside jokes.

Since the publication of *The Crystal Sun*, I have purchased an old photo of the Sphinx with the Great Pyramid in the background, which is reproduced in figure 3.9. This unusual photo, never before published, gives a striking image of the pyramid shadow, though it had not yet risen to its full height (or had declined from it). The photo was obviously taken several days either before or after the actual day of the winter solstice. It is only at the solstice that the shadow achieves the angle that I mentioned. However, this is the only other photo showing the sunset shadow at that time of year that I have ever seen, so I publish it here for the first time. I bought this photo with only the information written on the back that it was taken in 1941 by Frank Freeman, with no explanation as to who Frank Freeman might possibly be. I have done an Internet search, and it is possible that he might have been Professor Frank Nugent Freeman (1880–1961), who was dean of the School of Education at the University of California at Berkeley, and whose hobby was photography. However, I bought the photo in Britain, so it is more likely that it was another man. Maybe we will never know who he was. The shadow is cast on the south face of the Great Pyramid by the adjoining Pyramid of Chephren only at sunset near the time of the winter solstice, and the shadow reaches its culmination on that day, when it has the “golden angle,” the same angle as the slopes of the Ascending and Descending Passages inside the Great Pyramid. When I use the expression “golden angle” in this book and elsewhere, I invariably mean the angle of  $26^{\circ} 33' 54''$ , and *not* the angle of  $137^{\circ} 30' 27''$ , a related but more complicated angle derived from a formula (360 divided by *phi* squared) to which the name “golden angle” is sometimes applied by certain modern mathematicians. It is unfortunate that there are two angles competing now for the name “the golden angle.” As “the golden angle” figures prominently in chapters 7 and 8, it is essential that readers be aware of which angle I mean.

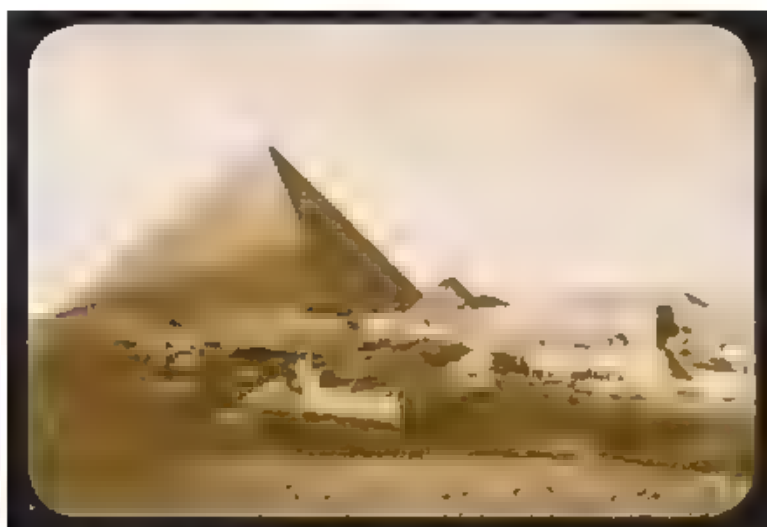


Figure 3.10. This remarkable photo taken in 1941 shows the sunset shadow on the south face of the Great Pyramid, which is cast by the adjoining Pyramid of Chephren. This photo was not taken precisely on the day of the solstice, so the shadow has either not yet culminated or is now in decline (depending on whether this photo was taken before or after the solstice, a detail we do not know), but on the evening of the solstice the shadow becomes the Winter Solstice Sunset Shadow. At that time, its acute angle at the southwest corner of the pyramid measures the same as the angle of slope of both the Ascending and Descending Passages inside the Great Pyramid, a unique angle known as “the golden angle.” This was a secret visual code of the Egyptian priests, showing on the outside what was on the inside. The slope of the ascending passage rising out of the Valley Temple beside the Sphinx has the same angle. As for the golden angle of the shadow, it is part of the huge multi-golden-angled complex of the Golden Giza Plan depicted in figure 7.25 and explained at length in chapter 7, pages 366–71. (Photo by Frank Freeman)

Color plate 31 in *The Crystal Sun* is a photo I took relating to another of my discoveries at Giza. The huge megalithic structure near the Sphinx that we call today the Valley Temple has a narrow sloping

passageway leading upward from the interior of the temple and out of the back onto the Chephren Causeway. We can call it the ascending passage of the Valley Temple, since it is on a slope. Of course, if you go back inside, the ascending passage becomes a descending passage, because you have turned around. But there is no doubt that the significance of the passage in terms of cult and ritual was to lead up and out onto the plateau of the sacred necropolis, so ascension was its motif, being also to the Egyptians a metaphor for resurrection. As I describe in *The Crystal Sun*, chapter 9, where I talk about all these things, I measured the slope of this ascending passage, something no one else had ever thought to do. I discovered that it had the same slope as the Ascending Passage and the Descending Passage inside the Great Pyramid, and also of course of the winter solstice sunset shadow on the Great Pyramid. The slope is 26 degrees, 33 minutes, and 54 seconds. It is what I have called the “golden slope.” Surely there must be some significance to all this?

Indeed there is. As I explain at some length in *The Crystal Sun*, this particular angle, which we can call the “golden angle,” is the precise value of the acute angle of a right-angled “golden triangle” that embodies the golden mean proportion (the ratio of 1 to 1.618). The Danish art historian Else Kielland established with conclusive and absolutely overwhelming evidence and analysis that this angle was the basis for all Egyptian art and architecture. She did this in her monumental work *Geometry in Egyptian Art* (Copenhagen, 1955). Figure 55 in *The Crystal Sun* is taken from her book and demonstrates some of her evidence. Figure 8.2 here is reproduced to help elucidate her ideas. These matters are discussed further in chapter 7.

The King’s Chamber inside the Great Pyramid embodies no fewer than eight occurrences of the golden angle, and the coffer in the chamber embodies yet more. Figure 54 in *The Crystal Sun* shows the use of the golden angle and the golden triangle to define the Grand Gallery. I also explain in *The Crystal Sun* that the solstice shadow on the Great Pyramid is truncated by the line running up the middle of the face (which in geometry is called the apothegm); this cuts it at exactly the right point to form a golden triangle, just as the commencement of the Grand Gallery on the inside of the same structure cuts the slope of the Ascending Passage at just the point to make a golden triangle. I also show, in plate 65 of *The Crystal Sun*, the aerial photo that proves that the apothegm of the southern face of the Great Pyramid is marked by a slight indentation made on purpose during the construction that is invisible to the naked eye on the ground and can be seen only from the air. The “formation” of the golden triangle by the solstice shadow could thus be known only by the gods and by the architects.

But we must not go any further into these matters, which I have already discussed at length in another book. My purpose for introducing the material here briefly is to explain my discovery that relates to the Sphinx’s connection with the Pyramid of Chephren. On this book’s website, [www.sphinxmystery.info](http://www.sphinxmystery.info), I reproduce some of the relevant illustrations from *The Crystal Sun*, as that book is now out of print.

In January 2001 I was allowed access to the Sphinx Temple (the largely ruined structure directly in front of the Sphinx) for the purpose of an archaeological investigation approved by the Egyptian Supreme Council of Antiquities. Normally the Sphinx Temple is kept locked, and few archaeologists have occasion or permission to enter it. It is never entered by tourists.



Figure 3.11. A photo from 1936 showing the clearing of the Sphinx Temple from beneath the sand by Selim Hassan. This is plate 32 following page 68 in Hassan's *The Great Sphinx and Its Secrets*, Cairo, 1953. This was the first time the temple had been seen for nearly four thousand years, since circa 2000 BC



Figure 3.12. The mountain of sand behind the men with wagons on rails is what was sitting on top of the Sphinx Temple in 1936, when this clearance by Selim Hassan was undertaken. On top of that sand mountain was, as we can see here, a number of modern tourist shops catering to the visitors to the Sphinx. They all had to be demolished before the sand could be removed from underneath them. This caused an enormous amount of local resentment, as many people lost their livelihoods and businesses. Only after all this was cleared away was it revealed that an entire lost temple lay beneath the buildings and the sand, the Sphinx Temple as we now call it. This photo is plate XXXI, opposite page 68, in Selim Hassan's book *The Great Sphinx and Its Secrets*, Cairo, 1953

Because I was allowed into the Sphinx Temple and spent considerable time there, I was able to notice many details that are not immediately obvious even to someone fortunate enough to gain access. Most people managing to gain special access would be allowed a quick look-round and then be ushered out again. But I had to linger due to the nature of my work. The floor of the Sphinx Temple may once have been covered with some fine substance. Selim Hassan thinks the floor was once of alabaster, and speaks of “the fine alabaster which paved its magnificent court.”<sup>7</sup> There are still large chunks of raw alabaster sitting around inside the temple, which I found rather peculiar, and for which there appears to be no obvious explanation. Egyptian alabaster is different from European alabaster; the former is calcium carbonate, whereas the latter is calcium sulfate. The true mineralogical name of Egyptian alabaster is travertine, and it is a form of limestone. However, the floor of the Sphinx Temple now consists simply of leveled bedrock. My detailed accounts of the Valley Temple and Sphinx Temple may be found in *Egyptian Dawn*, where I also explain the significance of the chunks of raw alabaster.



Figure 6.17 is a photo I took of the view of the Sphinx and the Pyramid of Chephren from the floor of the Sphinx Temple. As I gazed at the Pyramid of Chephren from inside the Sphinx Temple, I was suddenly struck by an idea. I took a device called an inclinometer, which we had with us, and took a sighting of the apex of the Pyramid of Chephren. I was able to confirm my hunch: the floor of the Sphinx Temple had been lowered into the bedrock to just the right depth for a sightline from there to the tip of the pyramid to form the golden angle. This angular relationship is shown in figure 3.12. A view of the Sphinx from the top of the Pyramid of Chephren is shown in the photo reproduced as figure 3.14, which was published in 1910.

This means that the slope of the sight line leading upward through the air from the floor of the Sphinx Temple to the apex of the Pyramid of Chephren matches the slope of the ascending passage leading up out of the Valley Temple next door in the same direction, and it forms a golden angle in three-dimensional space! Surely this is an example of the Egyptians carrying their surveying and design planning to extraordinary lengths!

I believe this is the true “direct connection” between the Sphinx and the Pyramid of Chephren. The locals have always known there was one, but they never understood its true nature even in ancient times. And since the Sphinx Temple was buried in sand and totally unknown during the New Kingdom, the vague tradition of this “connection” must go back to Old Kingdom times, which means a survival in folklore for about a third longer than the survival of the story of Thutmosis IV, or an additional thousand years.



Figure 3.13 A drawing looking northward, showing the Sphinx at right and in front of it the Sphinx Temple, beside which in the foreground is the Valley Temple. In the background are the Great Pyramid and its three mini-pyramids. At the left we see the Pyramid of Chephren. The shaded area is an artist's attempt to show the aerial golden angle that I measured with an inclinometer from the floor of the Sphinx Temple when I took a sighting of the tip of the Pyramid of Chephren. This drawing is not strictly accurate or to scale and is intended to be merely suggestive. The letter G represents “golden angle” as the acute angle of the aerial triangle is a golden angle, and this must have been intentional. The shaded area is shown as going below ground level, because the base of the triangle must be taken to be the horizontal surface of the floor of the Sphinx Temple, not the much higher level of the plateau surface beside the pyramid. (Drawing by Daud Sutton)



Figure 3.14. This photo, taken by Uvo Hölscher about 1900, was published in 1912. He was standing on top of the Pyramid of Chephren, looking due east. The Chephren Causeway is entirely covered with sand and invisible. The large unexcavated ruin in the foreground is the Funerary Temple of Chephren, which today is fully excavated, and which contains gigantic blocks of stone, some of them weighing more than fifty tons each. Beyond it, slightly to the left of the center of the photo, the head of the Sphinx protrudes from the sand. The Sphinx Temple, still unknown, is entirely buried in a huge mound of sand in front of the Sphinx at this time. The Valley Temple, known and partially excavated, but not yet excavated by Hölscher, is in front of the Sphinx and slightly to the right. The top of it may be seen, but little more, as a dark line protruding from the sand. In the distance, the floodplain of the River Nile extends toward Cairo. In ancient times, the river came right up to the foot of the Sphinx. To the right of the Sphinx, at the edge of the photo, is the huge old sycamore tree that may be seen in the foreground of figure 3.9 taken some decades earlier. This photo was published by Uvo Hölscher in his excavation report of the Valley Temple. Uvo Hölscher, *Das Grabdenkmal des Königs Chephren (The Funerary Monument of King Chephren)*, vol. 1 of *Veröffentlichungen der Ernst von Sieghin Expedition (Publications of the Ernst von Sieghin Expedition in Egypt)*, edited by Georg Steindorff, containing also contributions by Ludwig Borchardt and Georg Steindorff, J. C. Hinrich's Booksellers, Leipzig, 1912. This view is looking *downward* toward the golden angle of the acute angle made at the point below the sand in front of the Sphinx in this photo (i.e., the floor of the Sphinx Temple, which was still unknown and was unexcavated at the date of this photo). Because it is so difficult to get to the top of the Pyramid of Chephren, I know of no other photo like this one in existence.

Another point to be made is that the hypotenuse (the longest side, which is always opposite the right angle) of a sacred triangle was known in Egypt as “Horus,” a fact recorded by Plutarch in his treatise *On Isis and Osiris*. (I have discussed this in *The Crystal Sun*, and I discuss it further in chapters 7 and 8 here.) The sight-line leading from the Sphinx Temple to the top of the Pyramid of Chephren was a hypotenuse, and thus a Horus. This could explain why the name Horus was so often associated with the Sphinx even though the Sphinx was not always *identified* as Horus. Also, no other monument in Egypt was called “Horus-in-the-Horizon.” But if we consider the geometrical relationship that I have discovered, we realize that if we were to stand on top of the Pyramid of Chephren and look down the sightline, it would disappear into the horizon, and the sightline itself would thus literally be a Horus-in-the-Horizon. I was pleased when I discovered this fact, because I had never accepted the other explanations that various authors had suggested for the meaning and origin of this strange name as applied to the Sphinx.

Now we see even more reason to take the Giza folklore seriously. The folklore is also full of insistence on secret openings, doors, tunnels, and so forth in and around the Sphinx, and insistent also on the Sphinx's use as an oracle with a voice issuing apparently from its mouth. I have already pointed out in



chapters 1 and 2 how many openings, doors, tunnels, and so forth are really to be found at the Sphinx, even though most have been sealed off. In part 2 there are numerous accounts of these from early European travelers. We will have more to say about them later. Even when Caviglia was excavating the Sphinx, as we are told in the *Quarterly Review*, "The Arabs told Mr. Caviglia, that the French had discovered a door in the breast of the Sphinx [in 1798, nineteen years before Caviglia's excavations], which opened into its body, and passed through it to the second pyramid." All these things will be discussed further later on and relate also to the section containing the early travelers' accounts.

But let us turn now to another strange feature of the local folklore account of the story of Thutmosis IV, which I did not quote at the beginning of this chapter and have reserved until now. This is the remainder of van Ghistele's account of what the locals told him about that pharaoh, whose name they no longer remembered: "A little while after his coronation he [*the new king*] returned to the place where the head [*the Sphinx*] was, which he decapitated with an axe, saying: 'It's all very well that you have given me counsel so that I can secure Egypt; but from today on, you will not give any more counsel to anyone.' And it is thus that since then the head rests upon the ground up until our own time."

The first thing I want to point out about this part of the tale is that another small detail relating to Thutmosis IV is known to be accurate, namely the passage that says that he returned to the Sphinx "a little while after his coronation." In fact, the Dream Stela is dated in the first year of his reign, whereas one would not normally expect such a prompt tribute. A normal king would get around to it later. So this too reflects an accurate tradition.

But what are we to make of the strange tale, rather amusing in fact, that Thutmosis chopped off the head of the Sphinx and that is why it lies upon the sand? The last part of that is obviously a joke, since all the local accounts of the Sphinx agree that the Sphinx has a buried body, and this account itself states only a few sentences earlier that the Sphinx pleaded with Thutmosis to be cleared from the sand. None of the locals *really believed* that the head of the Sphinx was detached and "lay upon the sand." It was a witticism. But what clearly was believed was that the head had somehow been "decapitated" even though it obviously had not really been severed. And although the mutilation of the nose by the fanatical Muslim Sheikh Mohammed had already taken place, this cannot be what the locals were referring to. So what does this strange story really mean?

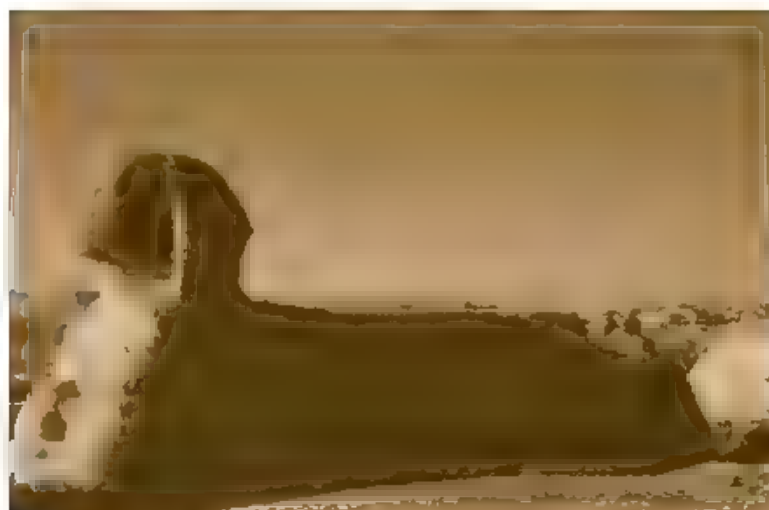


Figure 3 15 The immense body of the Sphinx has a tiny head that is out of proportion and has been recarved from a much larger head. At right, the rear of the Sphinx Pit shows the horizontal water level that was the general level during the time of its use as a Sphinx Moat. (Photo by Robert Temple)

I believe that this tale relates to the recarving of the face of the Sphinx, an action that was of such

drastic extent that the Sphinx was effectively decapitated and a face shaped out of a kind of stump. That the head of the Sphinx as we know it today, and as it has been known for many centuries, is far too tiny for the gigantic body has been remarked on by many people. This can be seen easily in figure 3.15 above and figures 4.1 and 4.2. Many people, including some Egyptologists, have suggested that the head was substantially cut down in size and recarved in the image of a pharaoh. What we have not known until now is *which* pharaoh, and when it happened. In the next chapter I answer these questions. It was not Thutmosis but an earlier pharaoh, and I have been able to identify him.

During the New Kingdom, the era of Thutmosis, the Sphinx was honored by a succession of pharaohs, including several before him, and the statue became an object of veneration to which offerings were made (another accurate detail of the folklore). It was apparently during that period that a pharaoh's beard of stone was carved and somehow affixed to the Sphinx's face. See figures 3.16 and 3.17 for evidence of holes bored into the face, to which the beard must have been affixed. As already mentioned, these holes were found in excavations in the nineteenth century, and part of the beard is in Cairo (fragments that were smashed in the museum, so that only some now remains of what was originally excavated) and part is in London. But this beard was most definitely not an original feature of the Sphinx. It was probably also at this time that the conical hole was bored in the top of the head of the Sphinx and used for the insertion of a pole to support an elaborate headdress. Selim Hassan was proud about filling up this hole in the 1930s: "A hole that existed in the head of the statue was also filled in."<sup>8</sup> This hole was 9 feet deep, with stones at the bottom so that its true depth was never determined, as several of the travelers' accounts in part 2 make clear. Some ill-informed people thought this hole might have been drilled by Howard-Vyse in the nineteenth century, but they are wrong. It was ancient, though probably not original. Pictures of the Sphinx shown on New Kingdom stelae show it with a headdress. An example may be seen in figure 3.18. It is generally also shown with its beard. In other words, the Sphinx was considerably "tarted up," as the British expression goes. It may also have had an ornamental collar thrown around its neck, since some representations show one. And it may have been at this time that the entire statue was painted with a red face and a yellow body. It was only in the twentieth century that the last vestiges of red paint vanished from the surface of the Sphinx's face. Many of the travelers' accounts in part 2 describe the red and yellow color of the Sphinx, and by the nineteenth century these accounts speak of traces of it being preserved here and there on the statue.



Figure 3.16. Beneath the left ear of the Sphinx are these two holes, doubtless drilled either during the Middle Kingdom when the face was recarved or during the New Kingdom, at whichever time the Sphinx's beard was affixed. (Photo by Robert Temple)



Figure 3 17 Here, the angle of the light enables us to see clearly the holes beneath the right ear of the Sphinx where the beard was affixed in later times. The modern concrete of the 1930s used as an extension of the side lappets of the *nemes* headdress is also clearly visible here, as is the way the bottoms of the stone portions of those lappets were chipped away to be level for the affixing of the modern concrete. (Photo by Robert Temple)



Figure 3 18 This stela was excavated by Selim Hassan in 1936 in the Sphinx precinct. This particular stela dates from the reign of King Thutmosis (Thothmes) IV, the pharaoh who cleared the Sphinx of sand and erected the Dream Stela. The solar disk is shown between two feathers of Maat arising from two ram's horns in the Sphinx's headdress. He is smelling three large blue lotus flowers (a symbolic flower; its delicate scent was meant to bestow immortal life). A solar disk with a single wing is seen floating in the air to the left of the headdress, which enables us to date the stela, as this was a short-lived design fashion. The hieroglyphic text below the picture says "A boon that the King gives, and Hor-em-akhet [Horus-in-the-Horizon: the name given to the Sphinx in the New Kingdom] (that they may) give him a sweet heart (i.e., contentment) in every place. Made by Inhermes." (Selim Hassan, *Sphinx*, pp. 136–37, figure 32. It is figure 32 also in *Le Sphinx*, opposite p. 86.)



Left: Figure 3.19. This stela, excavated at the Sphinx in 1936 by Selim Hassan, depicts Horus in the Horizon in falcon form. Horus in the Horizon became a name for the Sphinx itself in New Kingdom times, but originally, Horus in the Horizon was the name of the rising sun, who was the revived and resurrected Osiris, reborn at sunrise in the form of his own son Horus, especially at Giza (for a full account of this mythology and its relevance to Giza, see chapters 7 and 8).

Right: Figure 3.20. A photo of the stela shown in the drawing in figure 3.19, which portrays Horus in the Horizon as a falcon.

Several crude pictures of the Sphinx, of New Kingdom date and later, are reproduced in figures 3.21 to 3.23. These depictions were all found carved onto stelae erected in the Sphinx precinct and excavated there between 1817 and 1937. They all show the Sphinx with a beard, all but one of them with the beard clearly held on by a strap to a point below the ear where bored holes may be seen in figures 3.16 and 3.17. All but one show the Sphinx with a fancy headdress protruding from the point where the bored hole in the head is. Since the headdress varies, it may well be that the headdresses were interchangeable, different ones being set upon the Sphinx's head at different times as occasion required. All the depictions also show the Sphinx with a royal uraeus serpent on its brow. One of the depictions (figure 3.21) even shows two pyramids crudely sketched in the background. Since the view is taken from the south, and there is only one pyramid behind the Sphinx from that direction (the Great Pyramid), the two pyramids were clearly meant to be suggestive rather than accurate; they are in any case far too pointed. Not all these pictures of the Sphinx are really meant to represent the one at Giza, because three of them are clearly miniature models of it. But they give the idea, and despite their obvious inaccuracies, we are probably safe in assuming that the beard and headdress(es) were definitely attached to the Sphinx from the time of the New Kingdom until the Persian Conquest in 525 BC, when they may have been torn down.





Figure 3 21. A stela excavated by Selim Hassan in 1936 within the Sphinx Moat. Behind the Sphinx at the top, the pyramids of Giza are represented symbolically (there is no attempt at accuracy, as only the Great Pyramid is in that direction). This is the only known ancient representation of the Sphinx in association with a pyramid or pyramids. This is figure 12 opposite page 58 in Selim Hassan's *The Sphinx: Its History in the Light of Recent Excavations*, Cairo, 1949. The text in front of the Sphinx says "Hor em-akhet [Horus-in-the-Horizon], the Twice-great God, the Lord of Heaven." Underneath, it says "Made by the clever scribe. Mentuher." Two figures are then shown in adoration of the Sphinx, and the text between them reads "Made by the scribe KaMut-Nekh-teu, Justified." The stela was presumably erected at the expense of the two scribes who visited the Sphinx together. The stela probably dates from the New Kingdom. The falcon flying in front of the Sphinx's face is carrying the hieroglyph for "infinity" in his talons, representing Horus as a deity promising eternal life.



Figure 3 22. Selim Hassan excavated this stela in the Sphinx Precinct in 1936. This stela was offered to the Sphinx, under the

names of Hul and Hul-Atum, by a foreign visitor named Tutuya. The colors are well preserved on this stela, and the foreigner's hair is still shown as bright red. The foreigner is probably a Canaanite, who has chosen to call the Sphinx "Hul" after the Canaanite god Huron. The stela is believed to date from either the Eighteenth or Nineteenth Dynasty. The Sphinx's headdress here is the white Crown of the South. On the offering table in front of the Sphinx are depicted the conventional offerings to a deity. The Sphinx wears a huge decorative collar. (Hassan, *Sphinx*, pp. 151–52, figure 35. It is also figure 35 in *Le Sphinx*, opposite p. 97.)



Figure 3.23. This stela was excavated by Selim Hassan in 1936 in the Sphinx Precinct. It is dedicated to the Sphinx by an Egyptian prince named Amen-em Apt, who was a son of King Amenhotep II. He was also the older brother of the later king Thutmosis (Thothmes) IV, who is suspected of having murdered him and of having erased the older brother's name from this stela (though not in all places, so it can still be read). (Selim Hassan, *Sphinx*, pp. 186–97, figure 39. It is also figure 39 in *Le Sphinx*, opposite p. 108.)

Approaching the Sphinx during the New Kingdom, when people like Thutmosis IV were honoring it, one would have seen a very gaudy and unsubtle statue indeed. It would have had a feather on its head at least, if not a wild and waving headdress; a false beard; and probably a bright, thick bejeweled collar round its neck. And its face would have been painted a bilious red that probably resembled the bad makeup of a contemporary streetwalker. Taste had degenerated somewhat during the New Kingdom, when the pharaohs were what I call “the smiting pharaohs,” so often shown smiting their enemies, of whom they had plenty. Gone were the calm, tasteful days of the Old Kingdom, when art was more subtle. The geometrical canon was still observed in the New Kingdom, because it was the sacred tradition. But when it came to coloring and showiness, there were often lapses of taste into what can only be called vulgarity. And, frankly, sticking a feather or a crown on the head of the Sphinx can only be described as *frightfully* vulgar.

The last excavator of the Sphinx Temple was the German archaeologist Herbert Ricke, who published his report in 1970.<sup>9</sup>

Now to return to the story of Thutmosis IV decapitating the Sphinx. I believe that the cutting off of the original head and its recarving as a pharaoh's head did indeed take place at some time, and that the story refers to that action. But I am convinced that the recarving of the head of the Sphinx dates from long before the time of Thutmosis IV and was done by a much earlier pharaoh. The story of Thutmosis doing this was thus probably an example of conflation of tradition, where the pharaoh who in popular

consciousness was most closely associated with the Sphinx became conflated with the earlier pharaoh who recarved the face (even though the actual names of these two pharaohs were no longer remembered). A lot of discussion has taken place among Egyptologists about the date when the particular type of *nemes* headdress represented on the Sphinx was actually worn by historical pharaohs. Ludwig Borchardt in the nineteenth century was insistent that the date of the headdress and the eye stripes were from the Twelfth Dynasty of the Middle Kingdom, indeed from the precise reign of Pharaoh Ammenemes III (1929–1895 BC).<sup>10</sup> This opinion was ridiculed by various subsequent writers, who pointed out that his argument could not be substantiated from existing statuary and that Borchardt had manipulated various inconvenient facts to accord with his theory.

For instance, Selim Hassan accuses Borchardt of “an astonishing flight of fancy,” adding for good measure (as partially quoted earlier):

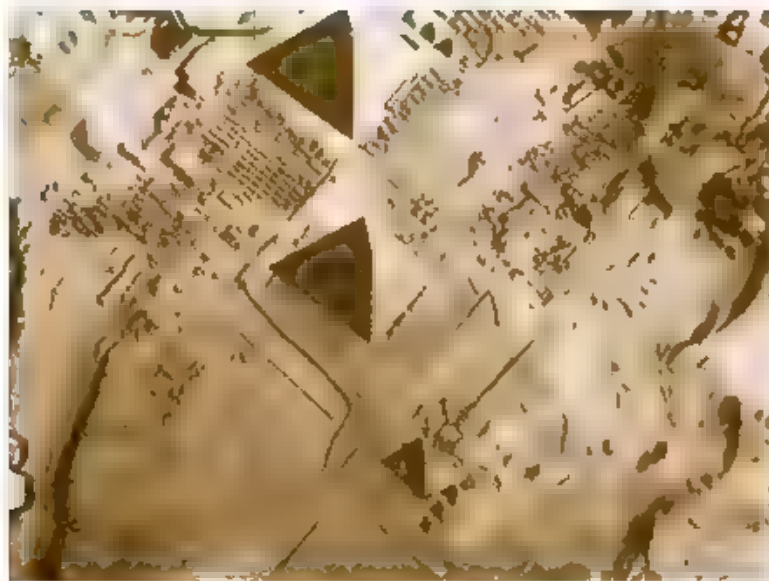


Figure 3.24. The three pyramids of Giza seen from the air, with the Sphinx near the top right corner to the left of the end of the long causeway. From top downward, the pyramids are: the Great Pyramid, the Pyramid of Chephren, and the Pyramid of Mycerinus. This uncredited photo was reproduced by Herbert Ricke as half of the frontispiece to his book, *Der Harmachistempel des Chephren in Giseh (The Temple of Harmachis at Giza)*, Wiesbaden, 1972. Ricke reexcavated the Sphinx Temple and decided to call it the Harmachis Temple, which no one else does. His choice of name was most inappropriate because Harmachis, the name given in later times to the Sphinx, was an unknown deity at the time the Sphinx Temple was last visible and in use prior to 2000 BC.

It seems to me that Borchardt had gone to a great deal of trouble to prove a theory that is altogether wrong from the beginning to the end, that is if he is not having a joke with the scientific world, and indulging in a little “legpulling” at our expense. Note how he refers to the Sphinx in the feminine gender, and at the same time passes observations upon its beard, and identifies it with the King!

If Borchardt was really serious about this article, then I think that of all the theories that he ever put into writing, he must have bitterly regretted having published this one!<sup>11</sup>

I have sat through lectures where Egyptologists have argued about whether the *nemes* headdress of the Sphinx dated from the reign of Cheops or only of Chephren in the Old Kingdom. However, I do not believe that the present face of the Sphinx dates from the Old Kingdom at all. In the next chapter, I shall give the evidence that I believe demonstrates the true date for the face of the Sphinx, and identifies the precise pharaoh whose face it is. This discussion will then answer the question: When was the face “cut down” and recarved? But this evidence alone does not answer the question: What was it cut down *from*? Or, in other words, what was the head of the Sphinx before the particular pharaoh had his own face

carved on the stump, or neck, of the original head?

Most people can probably easily accept that the head of the Sphinx was recarved as the face of a pharaoh. Only some people who are very sensitive and touchy about the Cheops-versus-Chephren argument will get highly excited at this. They have a vested interest in insisting that the entire Sphinx was carved either by Cheops (ca. 2589–2566 BC) or by Chephren (ca. 2588–2533 BC) and are prepared to dispute for hours with one another about which of these two actually did it. The fact that there is only a maximum of fifty-six years' difference between the two alternatives does not matter to them; they are engaged in a dispute, and nothing will calm them. I have already said, and will say here again, that it doesn't matter a bit which of the two pharaohs one chooses for having constructed the original Sphinx, as they are so close together. But any student of human disputes will have noticed that what most enrage and envenom people who are arguing with one another are often *small differences*. For some reason to do with human evolution, there seems to be some survival advantage for groups in the fact that small differences are often blown up out of all proportion, which explains why racism is so common, and why skin color (literally a superficial subject) arouses such passions. I suppose that this aspect of animal behavior so commonly seen in humans must have to do with breeding and survival of traits in species. But I prefer to take no part in it.

People who are worried about Cheops versus Chephren will certainly not want to have the interference to their dispute of the suggestion that the face of the Sphinx, which according to them was carved by either Cheops or Chephren (which is what they are disputing), could have been recarved. This would throw their whole argument out of kilter. They can't have that!

In my opinion, the Sphinx may be older than Cheops or Chephren. But, as I shall show in the next chapter, the face as it exists now was recarved by another and later pharaoh who can be precisely identified, and who did not live during the Old Kingdom at all.

In the next chapter, therefore, the true identity of the man whose face is on the Sphinx is revealed, together with all the evidence that makes this identification conclusive. Then, in the chapter after that, we shall consider what the original face of the Sphinx may have been before it was carved into the likeness of that particular pharaoh. And this leads us to a new idea of what the Sphinx itself truly represented. In other words, we then begin to approach the real question that should be concerning us: What is the Sphinx?



## THE FACE OF THE SPHINX

Every tourist who sees the Sphinx can see that the head is too small for the body. Millions of people every year become aware of this at first glance, and they often remark on the oddity of it. The disproportion of the head to the body is very clearly visible in figures 4.1 and 4.2, where the head appears to be merely a pimple on the vast bulk of the body. It is difficult to get a good photo of the Sphinx that shows this clearly because of the size of the monument and the fact that you cannot get far enough away to get it all into the photo very easily, even with a wide lens. But in figure 3.15 I think I have managed to show this, at the cost of cutting off the paws. Figure 4.1 is also taken from so far away to the north that the disproportion is obvious.

So what are we to make of this problem of the Sphinx's head? The head really does look as if it has been hacked down to a smaller size and recarved out of the stump of a larger neck. Everyone who knows anything whatsoever about Egyptian art and architecture knows that the Egyptians did not customarily build or carve things that were drastically—and in this case, spectacularly—out of proportion. Why go to all the trouble of carving a Sphinx out of the solid rock, sitting prominently as guardian of the Giza Plateau in front of the pyramids, if it is going to look ridiculous because it has a tiny little head on a giant body? Why not carve a smaller body in proportion to the head, if there was only enough stone to make a head that small? That is what one would expect of such careful artists as the Egyptians.

We must remember that this disproportion of the head to the body was not known for a couple of thousand years, from Roman times to the 1930s, because the body was covered with sand and the disproportion could not be seen. So the issue is therefore a modern issue, an issue dating only from 1926. What people in Roman times thought is no longer our concern; in fact, only one Roman account of the Sphinx survives, by Pliny, and the rest are lost. If anybody at that time thought the head was too small, we have no surviving record of it. And there are no surviving Greek accounts at all.



Figure 4.1. This photo of the entire Sphinx taken from the north, looking south, shows the outrageous disproportion of the present head to the body, something that is entirely against the canons and practice of Egyptian art throughout thousands of years of history. It is impossible that any ancient Egyptian would ever have carved an original statue with such a "pimple" head on such a large body. As is shown in figure 5.11, the present head was recarved out of the neck of a larger original head. The present head was recarved with the face of Pharaoh Amenemhet II of the Middle Kingdom, and although his ego cannot have been of modest proportions itself, out of fairness to him we must admit that there is a very good possibility that the original head had been mutilated, leaving only a neck stump, so that all he had to do was "rehabilitate" the monument in his own image. This would perhaps have seemed an act of piety rather than one of megalomania. (And as the history of the world's religions have proved, the two often go hand in hand.) (The photo is figure 26 in Herbert Ricke's book about his excavations of the Sphinx Temple, which he calls the Harmachis Temple: *Der Harmachistempel des Chefred in Giseh, in Beiträge zur Ägyptischen Bauforschung und Altertumskunde*, ed. by Herbert Ricke. Heft 10, Franz Steiner Verlag, Wiesbaden, 1970.)

It doesn't take a lot of imagination to realize that there must have been many megalomaniac pharaohs in Egyptian history, and any number of them would have liked to have his face put onto the Sphinx. The Middle East has had some well-known megalomaniac leaders in our time, and one can easily imagine earlier versions of the same type of person. The notorious Saddam Hussein of Iraq "restored" Babylon with bricks all stamped with his name and erected gigantic portraits of himself on every street corner in Baghdad: imagine what he would have done if he could have got his hands on the Sphinx! We should never lose sight of the fact that many kings, emperors, and pharaohs in the history of the world have been equally unpleasant, and have suffered from megalomania. The opportunities for sticking a pharaoh's face on the Sphinx were many, and it is more than likely, in my opinion, that this is precisely what happened.



Figure 4.2. An aerial photo of the Sphinx and the Great Pyramid taken sometime after 1937, probably during the 1940s. The excavations of Selim Hassan, completed by 1937, are finished in this photo. The modern road up to the Great Pyramid has not

yet been constructed and is still just a dirt track, seen here as a pale stripe winding up the hill to the right of the Sphinx. This photo is taken from the southeast, looking northwest. It is clear from this photo that far more of the ancient Nile quays in front of the Valley and Sphinx Temples were cleared at this time than they are today, for nowadays those in front of the Sphinx Temple are entirely covered over again. This photo gives a very good view of the Chephren Causeway leading up to the top left corner of the photo, where the Pyramid of Chephren is just out of the shot. The disproportionate size of the Sphinx's head is very obvious from above, being far too small for the body. (*Collection of Robert Temple, photographer unknown*)

The question of what the original head of the Sphinx actually was is another matter. Maybe it was an earlier pharaoh, the one who had the Sphinx carved in the first place. Or maybe it was an animal head. Some would say a lion's head. I have an idea about this matter, and I describe it at length in the next chapter, where I suggest it was an animal head and not a pharaoh's head. After all, there is no reason to assume that it had to be an earlier pharaoh's head, since that is a process of reverse reasoning. One cannot logically maintain that because the Sphinx has a pharaoh's head now, it had to have a pharaoh's head before. It could have been anything. Indeed, an animal head is far more logical and reasonable. After all, the human-headed sphinx as a motif in Egyptian art is really something that became popular in the Middle Kingdom only after about 2000 BC and was not a motif of the Old Kingdom, which is the latest possible date when the body of the Sphinx could have been carved, many centuries before the Middle Kingdom began. We must never extrapolate backward and use the criteria of the Middle Kingdom, when human-headed sphinxes became popular, to insist that this must have been the case in the Old Kingdom, when such ideas seem to have been absent.

A small statue of a human-headed sphinx of some kind was found at Abu Ruash, near Giza, and some people have suggested that it might be an Old Kingdom statue, while others have insisted that it is not. (It is shown in figures 4.3, 4.4, 4.5, and 4.6.) This object cannot be dated, since it is merely a statue excavated very long ago, with inadequate excavation reports, somewhere near or on a site that may or may not once have had a pyramid. Its date is just a matter of personal opinion or of guessing, since dating by association cannot be justified in the absence of any real contextual evidence of any kind. It could just as well be a Middle Kingdom statue, or even a New Kingdom one or a Ptolemaic one. It does not constitute evidence because of the impossibility of dating it. And there is no other evidence of human-headed sphinxes in the Old Kingdom, or Pyramid Age. What is more, this mysterious object from Abu Ruash has a female face, not a male one, and this is well known to be a typical late development in the evolution of the sphinx motif in Egyptian art. This point was noted by the historian of Mediterranean iconography (I suppose one would call him an "iconographer," which is a highly specialized corner of the history of art that impinges on archaeology) André Dessenne, in his book *Le Sphinx: Étude Iconographique (The Sphinx: An Iconographic Study)*, published in 1957.<sup>1</sup> Dessenne was not an Egyptologist, and Egypt forms only a brief initial portion of his wide-ranging study of the Sphinx motif in the art of many cultures. He surveys the Assyrians, Cypriots, Mitannians, Hittites, Minoans, and Mycenaeans. The Abu Ruash sphinx is the first sphinx that he discusses in his book (the second being the Great Sphinx of Giza), and here is all he says of it:

It is recumbent. Its face, beardless, is painted yellow, which, following the conventions, indicates that it is a woman's head. [Anyone can see that the face is obviously that of a woman; see figures 4.4 and 4.5.] For this reason the features and traits are more feminine and the hair is separated with a middle parting. The headdress has no uraeus.

This sphinx was found during the clearing of Djedefra's pyramid [a gigantic descending tunnel shaft with no roof, at Abu Ruash, where a "pyramid" has often been assumed in an unfinished state, since if it ever existed, it vanished long ago], and for this reason is thought to be contemporaneous to the



pyramid's building. It may have belonged to a queen mother of the 4<sup>th</sup> Dynasty. Djedefra being the predecessor of Khufu [Djedefra was Khufu's (Cheops's) son, so he could not possibly have been the predecessor of his own father, and this shows Dessenne's tenuous grasp of Egyptological matters!] suggests that the sphinx could slightly predate the one at Giza. It is curious that the earliest available evidence for a sphinx presents it with a woman's head. Surely this is pure coincidence. Other than for its head, the sphinx in question presents no major differences with the masculine type, which is the type with which my study is concerned. This makes it difficult to talk about the Abu Ruash Sphinx as a female, since female sphinxes really only appear much later, during the New Kingdom.<sup>2</sup>

Dessenne's lack of logic, and his even more appalling lack of knowledge of the basics of Egyptian chronology, renders most of what he says useless, except for his comment that female sphinxes really begin to appear only during the New Kingdom, a thousand years after the time of Djedefre. Clearly, the fact that Djedefre was the son of Cheops, and not his father, destroys Dessenne's suggestion that the Abu Ruash sphinx could be earlier than the Great Sphinx of Giza; at best, it could be from a subsequent generation. Dessenne is even so naive as to complain about this sphinx being female, because his book is only supposed to be about male sphinxes, which "makes it difficult to talk about." Although we are grateful for Dessenne pointing out how anomalous it is for a female sphinx to appear a thousand years earlier than any other, we can disregard the rest of his opinions. If he cannot get his pharaohs straight, then he cannot be expected to get his sphinxes straight either.

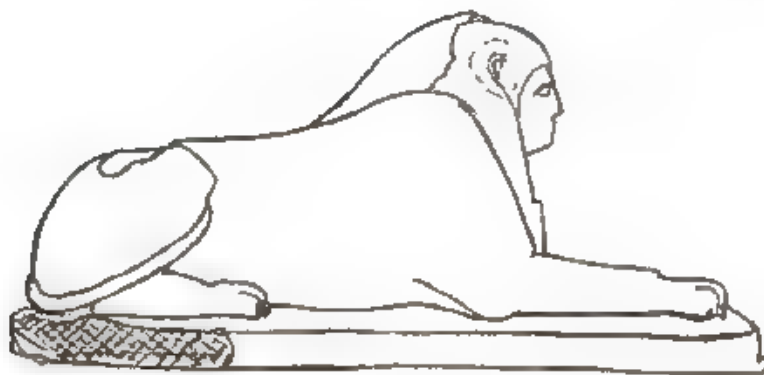


Figure 4.3 This is a drawing of the small limestone statue of a leonine sphinx with a woman's face, which was excavated at Abu Ruash in the nineteenth century and is of unknown date. The body is clearly that of a lion, with a rising massive chest, thick front shoulders, upward-sloping back, and heavy mane. If the Great Sphinx of Giza had been intended to represent a lion's body, it would have looked more like this. This sphinx is also represented in figures 4.4 to 4.6. Since this sphinx is so often mentioned in discussions as possibly being older than the Great Sphinx of Giza, it is important that we be thoroughly familiar with its appearance, for it would therefore constitute conclusive evidence that the Great Sphinx was not a lion. (Redrawing by Olivia Temple after Bodil Hornemann, *Types of Ancient Egyptian Statuary*)

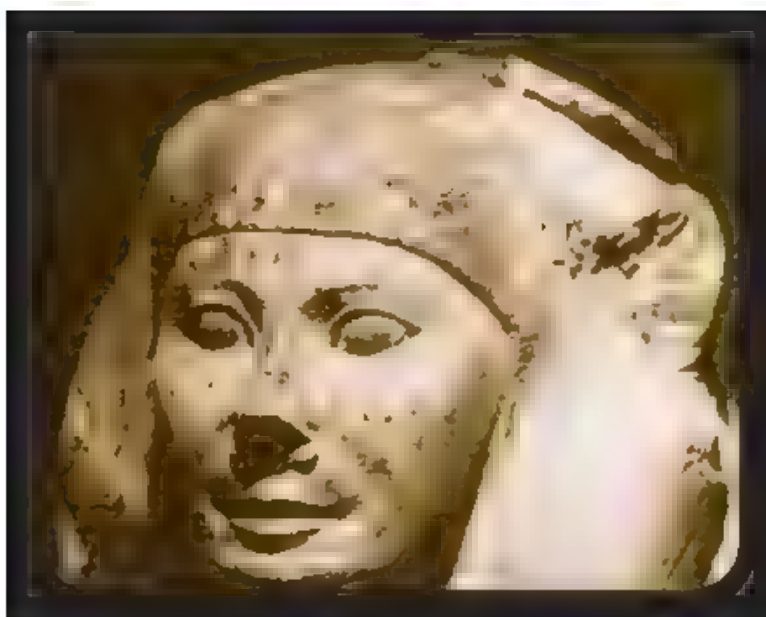


Figure 4.4. The female face of the small leonine sphinx statue excavated at Abu Ruash, date unknown. The headdress resembles that of a modern Muslim woman (Photo by Bernard V Bothmer)

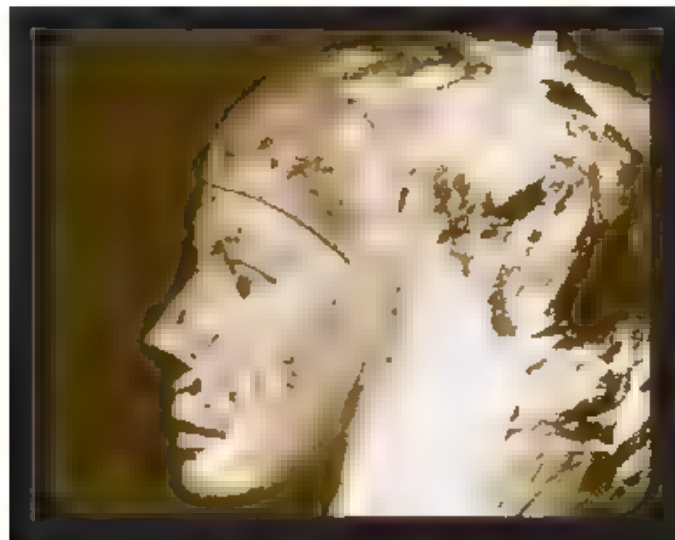


Figure 4.5. A profile view of the female face of the small Abu Ruash leonine statue of a sphinx. (Photo by Bernard V Bothmer)



Figure 4.6. A full view of the small leonine sphinx with a woman's face, carved from limestone, which was excavated at Abu Ruash, date unknown. (Photo by Bernard V. Bothmer)

The Abu Ruash statue bears no relation to the Great Sphinx of Giza, since its body is obviously that of a lion, with huge rising shoulders, a massive chest, and a line to its back in profile that rises at a steep

upward incline toward the head. The Great Sphinx has none of these features, a point that will be discussed in the next chapter. The bizarre female face, wild eyes, and plain headcloth (which suggests nothing to do with royalty whatsoever) are so atypical of Old Kingdom statuary, and the motif of a woman's face on an animal body being otherwise unknown for another thousand years, we must conclude that this strange statue has nothing to do with the Old Kingdom whatsoever. Why it was found sitting around on the high hill of Abu Ruash is a mystery. But Abu Ruash is an inadequately understood site that puzzles everyone. Frankly, I am inclined to believe that this statue is Ptolemaic, an attempt to represent the Greek sphinx (who was a wild and violent female creature) with whom Oedipus had his famous confrontation near the Greek city of Thebes. Possibly there was a Ptolemaic ritual center at Abu Ruash, where this strange object was produced in its late and hybrid style, combining the Greek and Egyptian sphinx legends in one statue. If the female face had been intended to represent a queen, she would never have been shown with no signs of a regal nature whatever, wearing only a head covering that looks very like a modern Islamic hijab. Certainly, the Abu Ruash statue was dismissed in two sentences by the Egyptologist Christiane Zivie-Coche in her book *Sphinx: History of a Monument*, where she says only: "A small limestone sphinx that some consider to be feminine has been attributed to Radjedef [this is the correct form of the name often given as Djedefre], Chephren's predecessor, who was buried at Abu Rawash [Abu Ruash]. Because of its *nemes* [headdress], a beautiful quartzite head of this king, now in the Louvre, supposedly belonged to a sphinx. These two early examples are not convincing, however, in part because they are not intact, and in part because there are problems with regard to their date."<sup>3</sup> (Zivie-Coche has written these two sentences in rather a confusing way, since the Abu Ruash statue has no *nemes* headdress, and the *nemes* she is referring to was on a sculpted head supposed to be of Radjedef, which is a completely separate object. It seems truly incredible that just because a detached head with a *nemes* headdress has been found, it is presumed once to have topped a sphinx. The lack of evidence and weakness of the logical inference of whoever made such an assumption—who is not named by Zivie-Coche—is absolutely staggering. This is how false assumptions spread, but it is to the credit of Zivie-Coche that she has rejected them.)

So in this chapter I leave aside for later the question of what was the original head of the Sphinx. What we are concerned with here is: Whose head is on the Sphinx now, and when was it put there?

I believe we can specify exactly whose head is on the Sphinx, and I can give the dates of his reign, so that the question can be answered with complete satisfaction.

Although the Sphinx cannot have been carved later than the Old Kingdom, and indeed it even has some Old Kingdom repair blocks on it, so it must have been carved pretty early, I believe that the head is from the Middle Kingdom.

There are some Egyptologists who strenuously insist that the head of the Sphinx is that of the pharaoh Chephren (Khafre) of the Fourth Dynasty in the Old Kingdom, who reigned approximately 2572–2546 BC. They even try to convince us that the face on the Sphinx resembles that of Chephren, identified statues of whom survive (Zivie-Coche firmly believes this, as we saw in an earlier chapter.) But it seems to me that any unbiased observer would have to admit that there is no resemblance at all between the two faces. People who say the face on the Sphinx is the face of Chephren are engaging in wishful thinking. They are seeing what they wish to see. Chephren's face is completely different. It is a long, narrow face, which that on the Sphinx is not. The German Egyptologist Rainer Stadelmann has very sensibly denied that the face of the Sphinx is that of Chephren. He says, for instance: "The ears are fundamentally different from those of the statue of Chephren. The ears of the Sphinx are very broad and folded forward, those of Chephren elongated and situated closer to the temples . . . The overall form of the Sphinx's face is broad, almost



square. On the other hand the features of Chephren were long, noticeably narrower, the chin almost pointed.”<sup>4</sup>

Stadelmann is absolutely correct in these observations. The face cannot be that of Chephren. Anyone who insists that it is might as well say that Tom Cruise looks like Humphrey Bogart. It just “ain’t so.” See figure 4.7 for a portrait of Chephren, which, if compared with the face of the Sphinx, is clearly of a different person altogether.

So whose does Stadelmann think the face is, then, if not Chephren’s? He speculates that it is of his older brother, Pharaoh Cheops (Khufu), who reigned earlier, approximately 2604–2581 BC. But here we have a problem. Whereas several splendid examples of statues of Chephren survive, only one tiny one of Cheops survives. I had a close look at it in the Cairo Museum, and really it is too small and lacking in detail for us to draw many conclusions about it, except that the face is not a long one like that of Chephren. The little ivory statue is only 3 inches high and 1 inch wide. You could easily hold it in the palm of your hand. There is no reason to believe that it is a serious attempt at portraiture. To use this as a basis to claim a likeness to the face on the Sphinx is hopeless. But for what it is worth, what likeness one can make out from this tiny statue also does not look anything at all like the face on the Sphinx. In figure 4.8 are several views of this only surviving likeness of King Cheops.



Figure 4.7 Pharaoh Chephren with the divine Horus falcon spreading its wings protectively around his head. This is the top portion of the famous larger-than-life-size statue of Chephren in dark gray diorite stone that was found intact in the well of the Valley Temple, having probably been hidden there by priests to save it from destruction when all his other statues in the temple were smashed to pieces by a rioting mob (thought to be during the First Intermediate Period). The statue is one of the most famous things to see in the Egyptian Museum in Cairo. It may readily be seen that Chephren had a long, thin face that in no way resembles that of the Sphinx of Giza. One of the strangest phenomena of modern Egyptology is that many Egyptologists persist in stating that this is the same as the face on the Sphinx. Draw your own conclusions, psychiatrists! (*The Egyptian Museum, Cairo*)



Figure 4.8. Three views of the head of the tiny ivory statue of King Cheops, the only surviving likeness of him. His face is clearly not that on the Great Sphinx of Giza. (*The Egyptian Museum, Cairo*)



Figure 4.9 This was once a likeness carved in relief of King Cheops, but someone in antiquity who evidently hated him chipped out his face, so we don't know what he really looked like. He is wearing the combined Crown of the North and the South.

In other words, all attempts to match the face on the Sphinx to Cheops or Chephren are failures. The face is also not that of any other Fourth Dynasty pharaoh whose likeness has survived. For instance, the face of Mycerinus (Menkaure) is also well known, and the face on the Sphinx certainly is not his either. Nor is it that of Pharaoh Radjedef (Djedefre), another pharaoh of that dynasty whose likeness is well known.

I suggest that the whole Old Kingdom should be forgotten when trying to identify the face, and that the face really comes from the Middle Kingdom, hundreds of years later, when I believe the recarving of the head was carried out.

If this were just a matter of my personal speculation, I would certainly never be writing a chapter about it. I might refer to it in passing, express my opinion, and then move on. But it is precisely because I believe that this identification *can* be justified by considerable evidence of a highly specific kind that I am prepared to make an issue of it.

The identification of the period of the face of the Sphinx was, in my opinion, correctly made in 1897 by the famous German Egyptologist Ludwig Borchardt, whose article on this subject I mentioned earlier. I believe Borchardt correctly identified the dynasty, though not the precise pharaoh, for the face of the Sphinx. By a curious coincidence, Borchardt was a predecessor of Stadelmann's. Both are former directors of the German Institute of Archaeology in Cairo. Borchardt's findings were published in a long-forgotten article in an obscure learned journal,<sup>5</sup> and I do not believe anyone in modern times has ever bothered to read it. It is entitled "Concerning the Age of the Sphinx at Giza." I consider this article so important that I have translated it in its entirety; it appears as appendix 2 of this book.

Borchardt wrote his article long before the Sphinx was cleared of sand, when the disproportion of the head to the body was still unknown. In those days, it was possible to stand higher and have a better and closer look at the Sphinx's head. Today one cannot do that. In fact, it is now almost impossible to see, except from old photos such as those in figures 1.21, 1.43, and 1.44, the necessary details of the top of the Sphinx's headcloth. For it is here that the specific clues as to the date and identity of the face are to be found. But in Borchardt's day, these were very clear and easy to see. One had only to stand there and look straight at them.

Those few Egyptologists who may still be aware of Borchardt's article on the Sphinx would be inclined to dismiss it without a thought, due to the fact that in dating and identifying the face as that of a



particular Middle Kingdom pharaoh, he made the mistake of insisting that the Sphinx as a whole was carved by that pharaoh, and thus dates from the Middle Kingdom. Now that the Sphinx is cleared, everyone knows that the idea of the Sphinx having been carved as late as the Middle Kingdom is entirely ludicrous, and hence Borchardt's old idea is dismissed as complete nonsense. No one would even bother to read the article through today, so ridiculous does its conclusion seem. No one but me, that is. For I had a hunch that Borchardt was on to something. And indeed he was! His only mistake was to assume that the entire statue had to be of the same date. It never occurred to him that the head could be a later recarving. But, then, he had not seen the body, which was not yet cleared! It was impossible for him to draw the correct conclusion about the age of a sculpture that was still buried in sand.



Figure 4.10. This glass lantern slide circa 1900 shows the locals clambering all over the head of the still-buried Sphinx. Note the raggedy edges of lappets of the *nemes* headdress, later chipped off and made even by Selim Hassan in the 1930s when he extended them with modern concrete. Why is it that everyone wants to make the Sphinx more beautiful and ends up doing the opposite? (Collection of Robert Temple)

One curious feature of the head of the Sphinx is that the pharaoh is wearing a cloth over his head, which Egyptologists call by its ancient name, *nemes* headdress, or *nemes* headcloth. Colloquially, it has even been known as the King's Bonnet. It was worn throughout Egyptian history by pharaohs, and in itself it indicates nothing about date. It appears to have had a sacred character to do with preparation for death (or "eternal life," as the Egyptians would say), as we shall see. But no one knows why it has the peculiar shape that it has, or why it is of folded and starched cloth. The pharaohs had various crowns, which they wore as kings, but the *nemes* is not actually a crown, although it is sometimes called one. The pharaohs wore it in their religious role as opposed to their political role as ruler. It is therefore entirely appropriate that the pharaoh's face on the Sphinx gazes directly east, toward the sun rising on the equinox, in a pious mode, wearing the *nemes* in indication of the pharaoh's reverence for the rising sun god and in expectation of becoming the companion of that god in the afterlife.

The *nemes* is mentioned specifically in some of the ancient texts of the Early Middle Kingdom. In Spell 75 of the Coffin Texts, found on the coffin of an Egyptian of that period named Heqata, the deceased, who has declared his identity with the sky god Shu, boasts: "I have claimed my *nemes*-crowns from the One who is in his cavern. It is the One who is in his cavern who fetched for me my *nemes*-crowns."<sup>6</sup> This clearly stresses the sacred nature of the *nemes*. The translator comments: "It here appears

that the *nemes*-crown is a necessary attribute in order to be able to ascend to the sky, and that 'Ruty, who is in his cavern' supplies it."<sup>7</sup>

Ruty, more often spelled Ruti, is the god described as "the One who is in his cavern." This cavern is also known as the House of Ruti, and it was necessary for any dead person to pass through it and collect his *nemes* to put on his head before proceeding to the House of Osiris, which was on an island, where he would be received in death by his "father," the god of the dead, Osiris.<sup>8</sup> And as we shall see later on, Ruti has specific associations with the Sphinx and with Giza. Ruti was an underworld aspect of the sun god himself, in his role of leaving the daytime barque of the sun and entering the nighttime barque of the sun<sup>9</sup> for his journey through the land of the dead, which was often envisaged as lying beneath the plateau of Giza and was imagined as being entered from the precincts of the Sphinx itself.

For the moment, all we need to know is that the *nemes* is a very appropriate covering for the head of the Sphinx, as it indicates religious reverence, and it is necessary for the deceased to put it on before proceeding to the World of the Dead and his eternal life.

The *nemes* seems to have been formed from a single cloth that was starched and folded in pleats, which then hung down over the shoulders. In the case of the Sphinx, the bottom portions of the *nemes* fell off and disappeared in antiquity, as the photos of figures 4.10 to 4.14 show clearly. At the present day, the folds of the *nemes* at the side of the Sphinx's face have continuations downward past the chin that are crude pieces of modern concrete, and which really ought to be removed, as they mar the edifice. They are examples of so-called restoration that are very clumsy and ugly.



Figure 4.11. Astereoview of the Sphinx dated 1896, showing a man standing on the head of the Sphinx. (*Collection of Robert Temple*)



Figure 4.12. This is a photo of the Sphinx from the early nineteenth century. At this time, only the head and back of the Sphinx were visible, and visitors could clamber all over the chest. The wagon on the left in the photo provides a very useful indicator of

the scale of distance, it stands about midway along the Sphinx's body. This photo is particularly useful for showing the stripe patterns of the headdress, which were crucial to dating the recarved face. The deep hole between the eyes has long been filled with cement. Here, the extent to which the nose was broken off and the lips damaged, and the right earlobe broken off, can be clearly seen, though much of this is today disguised by restoration work. (*Collection of Robert Temple*)

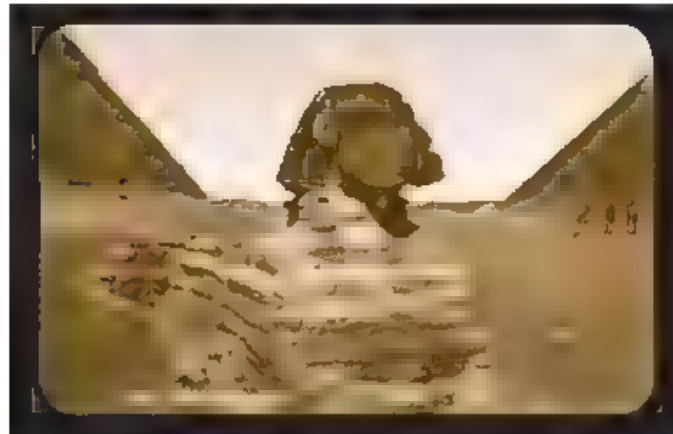


Figure 4.13. A postcard circa 1890, showing the Sphinx as it was at that time. (*Collection of Robert Temple*)

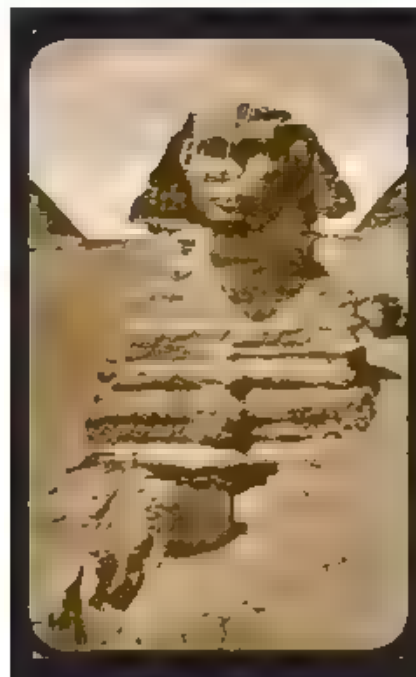


Figure 4.14. An old postcard circa 1900, showing the deluge of sand that has swallowed up the northern side of the Sphinx. (*Collection of Robert Temple*)

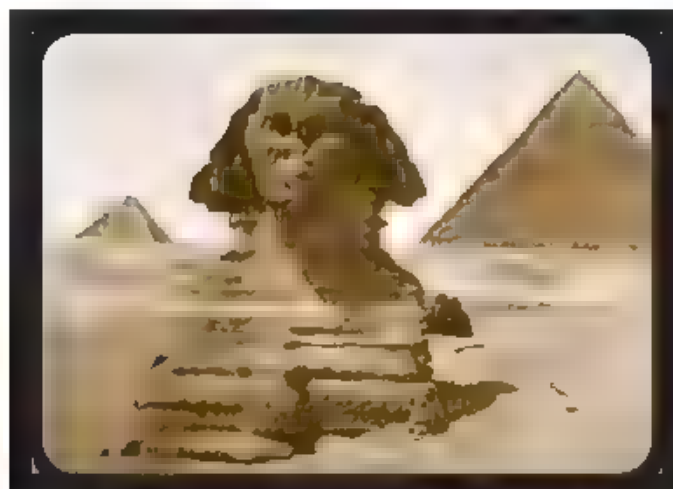


Figure 4.15. A postcard circa 1910, showing the Sphinx nearly as it was prior to 1817, before it was partially excavated in front by Caviglia. (*Collection of Robert Temple*)

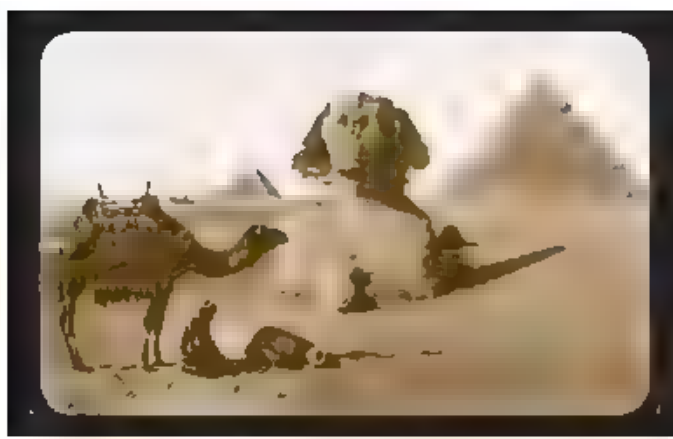


Figure 4.16 An old postcard circa 1910, showing the Sphinx nearly swallowed again by sand (*Collection of Robert Temple*)



Figure 4.17 In this old stereoview of unknown date, the Sphinx is covered again in sand to the top of the chest. I think this photo may be circa 1870, by which time the sand had all blown back again, and the results of Caviglia's excavations were totally obliterated. (*Collection of Robert Temple*)

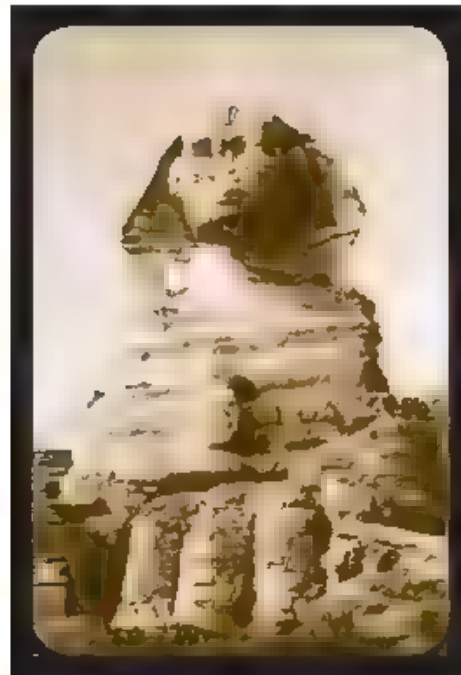


Figure 4.18. A postcard of the Sphinx from the late 1930s or 1940s, showing the terrible condition of the left paw at that time. The small stones are of Roman date, and many are about to fall off. Even the Romans were desperate to repair the eroded paw, but they did not do a very good job. (*Collection of Robert Temple*)

What Ludwig Borchardt decided to do, which no one else ever seems to have done, was to undertake



a scientific investigation into the details of the particular type of *nemes* headcloth worn by the Sphinx. He also took into account that the face of the Sphinx had eye-paint stripes, indicating a particular fashion that must have a specific date. He thought it might be possible to date these features, and he was right!

Borchardt begins by saying that he intends to approach the question of the dating of the Sphinx “from a different direction than has been done heretofore,” and he dismisses the supposed evidence from the so-called Dream Stela between the paws of the Sphinx as being unreliable. By this he is referring to the partial appearance in that stela, erected during the New Kingdom, of what some maintain is the name of the pharaoh Chephren, known in Egyptian as Khafre. In fact, this name, if indeed it really is a name at all, has partially peeled off from the stela, so only a single syllable can be made out. As the word was not set inside a royal cartouche (an elliptical line drawn around every royal name by the Egyptians), it cannot possibly have been the name of the pharaoh Khafre, for not to enclose it in a cartouche would have been extraordinarily disrespectful, and another pharaoh would never have done such a thing. The context is also vague, so nothing can really be concluded from it at all. Borchardt also dismisses attempts to analyze the face itself, saying, “the face is so ruined that . . . one can scarcely infer anything from it.”

He then says what his method will be:

In what follows, an attempt shall be made to arrive at a date based on details of dress, since for the present that seems to be the only safe way to date Egyptian sculptures, whereas for the treatment of such questions from the purely stylistic point of view there exists up to now neither sorted material nor sufficient preparatory work. We must for the moment content ourselves in the research which confronts us with settling the question solely as a matter of dress, by setting strictly aside all stylistic observations relating to the treatment of the actual portrait, the musculature and so forth, and thus reducing the question to something visibly obvious and tangible—or I might even say—numerical.

This makes a lot of sense, and one wonders why no one ever attempted it before, or, for that matter, why no one has attempted it since. Borchardt then proceeds to use his first method for dating the Sphinx’s head:

The first criterion of this kind with which we shall deal concerns the eye-paint stripes which are found projecting from the outer corners of the eyes of the Sphinx in entirely flat relief and with traces of blue pigment. Regarding these, we should need to apply the law, recently discovered by Herr [Friedrich Wilhelm, Baron] von Bissing, that eye-paint stripes were unknown in the Old Kingdom. That this is so is shown by the following statistics, which unfortunately only refer to what is in the Cairo Museum, but which could hardly be modified by objects from other collections

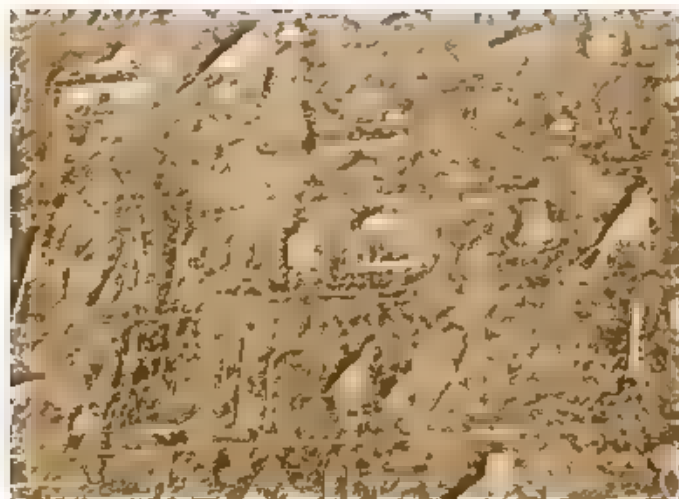


Figure 4.19 A close-up of the Dream Stela of Thutmose IV. I took this photo of part of the text of the stela to emphasize the careful way in which all royal names in that text were written in cartouches (see the center of the photo), which is the ellipse in which a king's name was always enclosed. This is a crucial point to make, because a now-flaked-off word of the text began with the syllable *khaf*, and many people have tried to insist that this was a reference to the pharaoh Khafre, better known by the Greek form of his name, Chephren. However, everyone admits that this *khaf* was not enclosed in a cartouche, so it cannot possibly have been a reference to Khafre/Chephren, as it would have been impious and insulting to mention that king without enclosing his name in a cartouche such as that seen here in the intact portion of the text. In fact, King Khafre/Chephren is not mentioned in the text at all, nor is King Cheops. The Dream Stela can only be seen properly if you are standing beneath the head of the Sphinx, where only people with special permission are allowed. Normal tourists can barely see the stela in the distance, much less see any detail of it whatsoever. (Photo by Robert Temple)

The Cairo Museum possesses in its Old Kingdom halls and storage areas over 230 statues and fragments of statues with heads which date from the Old Kingdom [this was in 1897]; none of these have any eye-paint stripes.

He then points out that eye-paint stripes seem to have made their initial appearance during the Sixth Dynasty, which was the last dynasty of the Old Kingdom (2347–2216 BC).

We have the first appearance of eye-paint stripes during or after the 6th Dynasty, which was the time when all the radical changes in dress and customs appeared, which separate the Middle Kingdom from more ancient times, so that certainly in terms of the history of art, but perhaps also in the political sense, one can properly speak of the Middle Kingdom having begun with the 6th Dynasty.

What we have ascertained from the statues is shown also by the reliefs. Prior to the 6th Dynasty eye-paint stripes cannot be demonstrated anywhere, but thereafter they make their appearance everywhere.

So Borchardt then concludes on the basis of this criterion: "Now, the Great Sphinx has obvious eye-paint stripes. Therefore the time of its creation falls into the period subsequent to the Sixth Dynasty."

It is at this point that most or, to put it more bluntly, all of Borchardt's readers today would fling down his article in dismay, looking on this strange notion as Borchardt's greatest folly, or perhaps they would just laugh. After all, the idea that the Sphinx dated from some time subsequent to the Sixth Dynasty is just so silly that the man must be off his head. But as I have said earlier, we have to remember that Borchardt had never seen the Sphinx. He had seen only part of its head and the top of its back, and this article was published in 1897, nearly three decades before the Sphinx was properly cleared of sand. What Borchardt was doing was making an intensive study of that portion of the Sphinx that was readily visible, namely the head. And he certainly studied it more carefully than anyone before or since.

But if it were only the eye-paint stripes that Borchardt considered, we could always dismiss it by saying maybe he was wrong about that. Maybe there were earlier eye-paint stripes, but we have just lost the evidence. The really convincing part of Borchardt's analysis concerns something else entirely. He decided to look at the pattern of the stripes portrayed on the *nemes* headcloth. It is easy to overlook this detail, as such decoration seems merely gratuitous. And today it is difficult to see these at all, because you cannot get a high enough angle to see the top of the Sphinx's head directly anymore. Also, the sunlight needs to be right to get some contrast, and the glare of the sky can be a problem. The pattern of the stripes is now very difficult indeed to make out from ground level because we are too far below them to get a good look. But in Borchardt's day, it was easy. And thank goodness we have plenty of photos from that time, which record the stripe patterns unmistakably for us, as figures 1.16, 1.21, 1.22, 4.10, 4.12, and 4.18 make clear. After all, in the old days when one was standing at neck level looking the Sphinx directly in

the eye, it was hard to miss the stripe patterns.

In evaluating the analysis of Borchardt, we need to consult figures A, B, C, and D, which are reproduced from his article, and which are reproduced in appendix 2, along with the complete translation of that article. These show different stripe patterns used on *nemes* cloths. C and D show the patterns that actually appear on the Sphinx.

We need to follow Borchardt's analysis rather closely now, and to do so it is best to use his own words:

Just as this criterion has given us the lower date limit, so we can find the upper limit in the ornaments of the headdress, the so-called King's Bonnet. This decorated piece of cloth lying over the forehead with the uraeus, which is the symbol of the kings, is tied firmly to the forehead with a headband. It frames the face, creating two triangular areas which fall in two pleats on either side of the face down the neck onto the chest. At the back it is gathered together and ends in a plait lying down the back, which is ribbed as well as appearing to be wrapped. The pattern which this scarf shows is in most cases the following. the front folds are, as shown in A, both in frontal view and also in section, folded into horizontal pleats, the piece covering the head, however, is divided into regular alternately sunken and raised stripes (see figure B), which with statues of which the painting is still showing, is depicted in alternating yellow and blue shades.

This King's Bonnet was of course fashion-dependent, and so we can at least in the statues follow different variations through time. From the 18th Dynasty, or perhaps even a little earlier, it becomes fashionable to supply the inside with a vertical smooth hem. Around the 19th Dynasty it becomes common practice to extend the regular division of the stripes of the upper part of the front pleats to the chest by giving up the pleats, and at the same time they now divided the ribbed plait instead into sunken or raised horizontal stripes as well.

The Great Sphinx of Giza also shows yet another pattern in its headdress

The stripes of that headdress given as sunken are arranged in groups of three stripes each, that is, one wider stripe is always placed between two narrower stripes. Each of the wider stripes has on either side a small accompanying stripe. And this differs from the usual arrangement with stripes of equal width. And therefore we have to examine where and when this anomaly occurs as well.

The following list which shows those kings' statues with the stripes which are grouped in this manner will show this immediately. We must distinguish between two different forms: those with completed groups (figure C) and those where they are only indicated in simple lines (as in figure D). Both types of course belong to the same type, the second is only an abbreviation to the first.

In a footnote, Borchardt makes clear that "we are always only speaking of the stripes on the upper part and the side part of the cloth. The regular pleating of those cloths falling over the chest are not considered here."

Borchardt then gives lists of statues, heads, and busts that were examined. He found six at the museum then at Giza, all from the Twelfth Dynasty of the Middle Kingdom. His friend Heinrich Schaefer, the famous expert on ancient Egyptian art, reported on five more of the same date in the Berlin Museum. In the Louvre, Schaefer found one more, none was found in the British Museum; but two were found in English private collections. These were the collections searched in person. A further search was made in photo collections of other museums, where no further examples were identified. As a result of this search, fifteen clear examples were found to substantiate Borchardt's thesis, and none was found to contradict it.

His conclusions were very clear and specific, and on this basis he suggests that there was probably only one pharaoh whose face could possibly be that of the Sphinx, the great and powerful Middle Kingdom pharaoh Amenemhet III of the Twelfth Dynasty (1818–1770 BC):



Figure 4.20. A portrait of King Sesostris (Senusret) I (1971–1926 BC), the second pharaoh of the Twelfth Dynasty. His face is very different from that on the Great Sphinx of Giza, and the stripe pattern on his *nemes* headdress does not match it either. The Great Sphinx's face is clearly not his.

The grouped stripes on the King's Bonnet are only found during the 12th Dynasty, perhaps only under Amenemhet III, because those pieces which are precisely dated and which have such an arrangement of stripes are all from his time. And of the others which are only dated generally to the 12th Dynasty it can never be discounted that they also might be images of Amenemhet III. For this more narrow limitation of this fashion of stripes to the time of Amenemhet III speaks as well as the circumstance that the statues of [Pharaoh] Usersten [now usually called by his other names, Pharaoh Senwosret III and Sesostris III; he was Amenemhet III's father] from Lisht (Giza, Numbers 411–420, Catalogue 1895, Supplement 3, Number 1365, Hall 21) have not grouped but merely regular stripes. But whether or not one wishes to limit the time of the grouped stripings to the reign of Amenemhet III, one thing is for certain: after the 12th Dynasty, this fashion has vanished. The statues of the 13th Dynasty, Sebekhotep (Louvre, Cast G 1, Catalogue S. 332, Berlin) and Sebek-em-sa-f (Giza, Number 386, Catalogue 1895, Number 128, Hall 16), already display the regularly striped King's Bonnet.

So for the dating of the Sphinx at Giza we draw from all of this the following conclusion: Because the headdress of the Sphinx shows the wide stripes with the narrow accompanying stripes, the Sphinx therefore can surely not have been created after the 12th Dynasty. We have now enclosed the origin of the Sphinx within two limits, an upper and a lower.

According to the makeup stripes it is 6th Dynasty or later. According to the stripes on the headdress, it is before the end of the 12th Dynasty. If one wishes to be less cautious, one can add to this perhaps the time of Amenemhet III.

Borchardt cautiously adds: "Finally, if one really wants to, one could even read the type of Amenemhet III's face into the countenance of the Sphinx. But as I have said already in my introduction, this is a rather questionable argument because of the destruction of the features."



In my opinion, Borchardt's calm, reasoned, and logical approach is an absolute model of disinterested forensic analysis, far removed from any desire to prove or retain a theory for reasons of vanity and egotism. Although we shall see that Amenemhet III is probably not the correct pharaoh, there seems to me no question whatsoever that Borchardt is accurate in insisting upon a Twelfth Dynasty face for the Sphinx, and that his analysis of the fashion of the headdress, and so on, was absolutely sound.



Figure 4.21. A leonine Middle Kingdom sphinx with the face of King Sesostris (Senusret) III (1878–1839 BC). His face is clearly *not* that on the Great Sphinx of Giza. Because this sphinx was later usurped and reused by a pharaoh of the Fifteenth Dynasty, whose members were foreign invaders from the east known as the Hyksos, this sphinx was for a long time known as a Hyksos sphinx, though we now know that they merely stole it and put a new name on it. (*Collection of Robert Temple*)

One of the aspects of the face of Amenemhet III that is particularly striking is his ears. Stadelmann criticized the suggestion that the face of the Sphinx was that of Chephren because he said the ears didn't match. The ears of Amenemhet III match those of the face of the Sphinx precisely! They are large and prominent and have the same conformation. Amenemhet III was also a very strikingly handsome man, and the general shape of his face matches that of the Sphinx, in a way that of Chephren most emphatically does not. A statue of Amenemhet III is shown in figure 4.22. If you hold this up side by side with a photo of the face of the Sphinx, you can see that the ears are the same. And the same stripe pattern is seen in the *nemes* headcloth, of the fat central stripe surrounded on each side by a thin stripe. If you look at works depicting most other pharaohs in *nemes* headcloths, you will not find this pattern, and they certainly occurred throughout Amenemhet III's reign, which lasted approximately 1853–1805 BC. (Officially he reigned for forty-eight years, but it is thought he really reigned for at least fifty.)

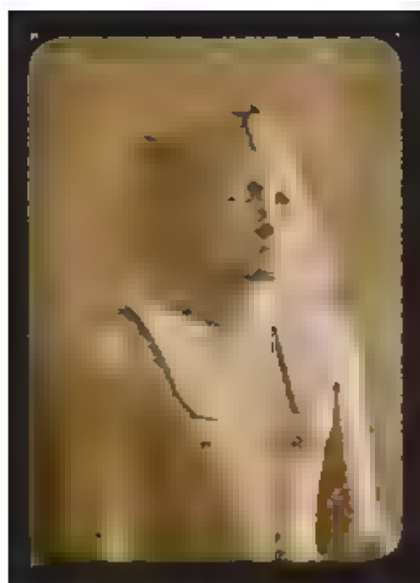


Figure 4 22 A statue of the Middle Kingdom pharaoh Amenemhet III when very young (Taken from plate 21 of Adolf Erman, *Die Welt am Nil* [The World on the Nile], Leipzig, 1936)

After Borchardt's article was published, did anybody take it seriously? Wallis Budge referred to Borchardt's theory without mentioning Borchardt's name in the volume of his *History of Egypt* published in 1902, which dealt with the Middle Kingdom and Amenemhet. He writes: "A theory has recently been propounded which makes the head of the Sphinx at Gizeh [Giza] to represent that of king Amenemhat [Amenemhet] III, 'by whom it may be supposed to have been erected;' but no evidence in support of it has yet been adduced, nor have the old views concerning the Sphinx yet been proved incorrect."<sup>10</sup>

Since the statement "by whom it may be supposed to have been erected" does not appear in Borchardt's article, we must presume that Wallis Budge did not (or perhaps could not, since he evidently did not know German) actually read Borchardt's article itself, but rather relied on a superficial account of it elsewhere, perhaps in a periodical. It may be that Wallis Budge hesitated to mention Borchardt for this very reason, that he was drawing only on a secondary source and felt so unsure of his grasp of the details of Borchardt's argument that he did not wish to criticize him by name. It is also untrue, as we have seen, that "no evidence in support of it has yet been adduced," for Borchardt's article was in fact one long summary of overwhelming evidence; this proves conclusively that Wallis Budge did not (*could not*, for lack of knowledge of the German language) actually have read it.

In 1910, the eleventh edition of the *Encyclopaedia Britannica* appeared, and in the entry for "sphinx," Borchardt's article was cited. It was due to the fact that I have this edition of the encyclopedia in my home that I learned of the existence of Borchardt's article in the first place. Actually obtaining a copy of Borchardt's article was very difficult, though the hand of fate was at work, since I managed to purchase an offprint of it from a dealer in rare books in Germany. My facility for finding impossibly rare publications was certainly at work here, in what American slang describes as "big time." Translating Borchardt's article with the aid of my German friend Eleonore Reed was a tremendously difficult task for both of us, due to the extreme precision required in elucidating Borchardt's careful physical description of the kind we have already read. (Borchardt's full text in translation can be found as appendix 2.)

The only other reference to Borchardt's article in English that I have ever seen is in the large volume on the Sphinx by Selim Hassan published in 1953 at Cairo.<sup>11</sup> He translates portions of the article into English, although not always correctly, and he does not agree with Borchardt for obvious reasons, having just personally excavated the Sphinx and cleared it of sand, proving beyond doubt that it was far older than the Middle Kingdom. But what never occurred to Hassan was that Borchardt's analysis of the face

might be accurate regarding the face alone. In fact, Hassan didn't think of the face as detachable from the body any more than Borchardt thought of the body as detachable from the face. The problem has always been that people cannot separate the two in their minds. They think of the Sphinx as a unity when it probably is not. The "unity" of the Sphinx probably ended in the Twelfth Dynasty, which is about the time when a very egotistical young pharaoh put his own face on the great monument that lay at the feet of the Giza Plateau. However, there is every reason to believe that the original head and face of the Sphinx was badly damaged by that time and beyond hope of repair, so an alternative was not really a bad idea. And let's face it (pun intended) the face of the Sphinx is sufficiently striking that we shouldn't complain. It inspires awe in all who see it, just as the pharaoh who put his face on it presumably hoped it would. Perhaps the extraordinary wide-open eyes are meant to indicate the eager gaze with which the reverent pharaoh peers at the eastern horizon, hoping to catch a glimpse of the sun god, who will rise at any moment. Normally Egyptian statues do not show the eyes opened so wide as this, for portraits tend to show kings in repose. But the face of the Sphinx is not in a state of repose; it is in a state of expectancy, as is appropriate under the circumstances of someone watching for the sunrise.

Who was this Amenemhet III, whose face Borchardt claimed may have been looking down on the rest of us for all these ages? He was a pharaoh particularly noted for immense building projects, for vast irrigation works, and also for an obsession with sphinxes! He lived in a peaceful era, didn't waste time making war on neighbors, and was one of the greatest builders in the entire history of Egypt. He built the famous Labyrinth at Hawara, which is now almost entirely destroyed (see figure 4.25). A few comments about Amenemhet from Wallis Budge's *History of Egypt* gives a good idea of the man. In the histories written by Sir William Flinders Petrie and Erik Hornung, little is said of Amenemhet, so it is necessary to quote from Wallis Budge, who gives him his due credit:

Amenemhat [his spelling of Amenemhet] III, the son and successor of Usertsen III [now called Senusret III or Sesostris III], was the greatest of all the kings of the XIIth Dynasty. . . . The whole of the energies of this king appear to have been devoted to improving the irrigation system of his country. . . . Amenemhat III found Egypt in a state of great prosperity when he ascended the throne, and as the land had rest [was at peace] during his long reign, he was able to leave his country in a most flourishing condition at his death. Art, sculpture, and architecture flourished under his fostering care, and the remains of his buildings and inscribed monuments testify to the activity which must have prevailed among all classes of handicraftsmen during his reign. . . . The king's activity in building continued throughout the whole of his reign. . . . At [his] time the river level during the inundation was about twenty-six feet higher than it is at the present time [in 1902]. . . . [He] seems to have endeavoured [by annual measurements, which are recorded] to understand the effects upon the agriculture of Egypt caused by inundations of varying heights. . . . The greatest and most useful of all the great works which were undertaken by Amenemhat was the making of Lake Moeris in . . . [the] Fayyum. [The Fayyum is a giant oasis region southwest of Cairo, which has always been heavily populated and agriculturally productive.]. . . . The largest circumference of Lake Moeris was about 150 miles; its area was about 750 square miles.<sup>12</sup>

The most amazing building feat of Amenemhet III was the Labyrinth at Hawara in the Fayyum. It seems almost unbelievable that all but a few pieces of stone have now vanished. Wallis Budge says sadly:

The extent of the area of the Labyrinth is probably marked by the immense bed of chips of fine white limestone which lies to the south of [his] pyramid, and on tracing this bed to its limits, it is found that



they cover an area which measures 1000 by 800 feet. The principal part of the pavement to be seen is in the eastern half of the site, and some years ago it covered a tolerable space; but the builders of the railway into the Fayyum discovered the place, and took the stones away to build the line; thus the last remains of the wonderful building disappeared under the process of “civilizing” Egypt.<sup>13</sup>

Figure 4.23 is one of my photos of Amenemhet III’s mud-brick pyramid at Hawara, and figures 4.24 and 4.25 are the ones that I took from the top of the pyramid showing part of the remains of the site of the Labyrinth. To appreciate the magnitude of Amenemhet’s building operations, one has to read the account of the Labyrinth left by Herodotus, the Greek historian of the fifth century BC, who visited it:

I have seen this building, and it is beyond my power to describe; it must have cost more in labour and money than all the walls and public works of the Greeks put together. . . . The pyramids, too, are astonishing structures, each one of them equal to many of the most ambitious works of Greece; but the labyrinth surpasses them. . . . The baffling and intricate passages from room to room and from court to court were an endless wonder to me, as we passed from a courtyard into rooms, from rooms into galleries, from galleries into more rooms, and thence into yet more courtyards. The roof of every chamber, courtyard, and gallery is, like the walls, of stone. The walls are covered with carved figures, and each court is exquisitely built of white marble [limestone] and surrounded by a colonnade.<sup>14</sup>

It is extremely irritating to think that the pavement of this monumental construction was stripped away by railway engineers at the end of the nineteenth century and used for something so mundane as laying the bed of a railway track. In fact, this is one reminder that a great deal of the destruction of ancient Egyptian monuments has taken place more recently than we feel comfortable in admitting. Another example of this is the total demolition during the nineteenth century of a beautiful temple on the island of Elephantine. This all goes to prove that oafs are everywhere and active at all times.



Figure 4.23 This is the strange condition of Amenemhet III's Pyramid at Hawara in the Fayyum today. Unable to build pyramids in stone anymore, the pharaohs of the Middle Kingdom had to use mud bricks instead. Over the millennia, the erosion caused by rainstorms, sun, and wind have turned the once regular pyramid into this wonderful surrealistic work of art, a symphony of light and shade of a kind that the pharaoh never intended. No wonder that Amenemhet II sought to immortalize himself in stone in the only way he could, by carving his face on an older monument, the Sphinx! (Photo by Robert Temple)



Figure 4.24. The pathetic remains of the Labyrinth at Hawara in the Fayyum, which was once one of the Wonders of the World, as described by Herodotus. Now, the pockmarks in the sand and a few blocks of stone are all that is left. Even in the nineteenth century, huge portions of the Labyrinth were stripped away and the stone used as sleepers for the Fayyum Railway. If the railway were ever replaced and its stones salvaged, a considerable portion of an ancient monument could be recovered. This photo is taken from above, standing on the remains of the mud-brick Pyramid of Amenemhet, which itself is in no great shape. (Photo by Robert Temple)

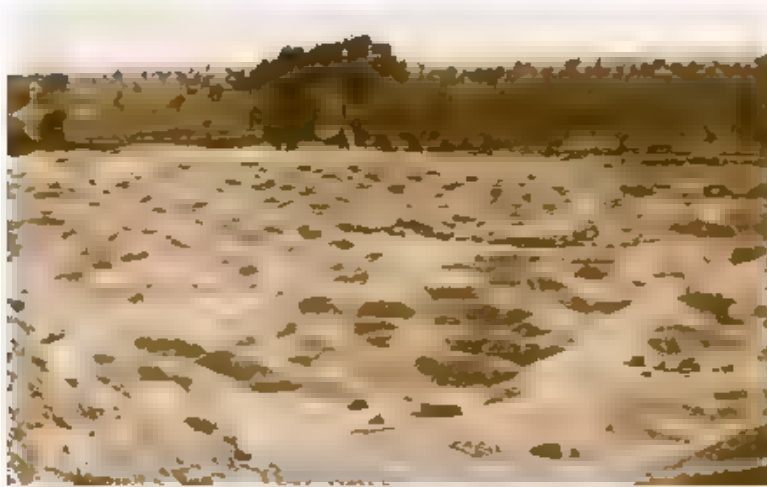


Figure 4.25. The remains of the Labyrinth at Hawara, seen from the side of the mud-brick Pyramid of Amenemhet III. (Photo by Robert Temple)

So if Borchardt were right, we would have the comfort of knowing that the face on the Sphinx is evidently that of one of the greatest pharaohs in the history of Egypt, not just that of a nobody. And the enigmatic expression on the face, made more so by having lost its nose and by its other damage, does bear comparison with the flickering half-smile of Leonardo da Vinci's "Mona Lisa." And like the face of the Mona Lisa, its gender has been questioned. Serious suggestions have been made that the Mona Lisa is really a man dressed as a woman. And for centuries, the Sphinx's face was thought to be that of a woman, as countless early travelers relate. A touch of androgyny always makes a face more intriguing.

One other crucial fact about Amenemhet III is that he was obsessed with sphinxes, and that is certainly appropriate for someone who Borchardt suggests put his own face on the greatest sphinx of them all. There are several surviving small sphinxes that bear the face of Amenemhet III. These are well known to Egyptologists, and it is therefore puzzling that they don't seem to have put two and two together. When some of these sphinxes were originally discovered at the site of the city of Tanis, they were at first thought to date from a later period known as the Hyksos period. But eventually Egyptologists figured out that these statues had been "usurped" by the later Hyksos kings. The process known as "usurpation" was very common in Egyptian history. Lazy builders and sculptors simply plundered previous buildings and works of art and relabeled them. In fact, whole temples could be cannibalized in this way, and often were. One bust of Amenemhet III was usurped by the New Kingdom pharaoh Merenptah, and the lazy sculptor of the

later period had the audacity to chip away part of the face to make it look more like Merenptah! As Wallis Budge says, “. . . certain features, e.g., the muscles at the corners of the mouth, were altered by hammering in order to make them to resemble those of the usurper.”<sup>15</sup> As for the sphinxes found at Tanis, “We probably see good representations on those of the maker of Lake Moeris and of one of the greatest kings who sat upon the throne of Egypt.”<sup>16</sup>

As for his character, perhaps Amenemhet III was a madman and a megalomaniac, and perhaps he was not. It was singularly immodest of anyone to stick his face on the largest sculpture of Egypt, and whoever did it cannot have been without a considerable ego. But so it has always been in the affairs of our species, and so it will doubtless always be: the pushy ones think they are Ra’s gift to humankind.

However, it is now possible to narrow down the search for the Sphinx’s face even further. Yes, Borchardt was right about the dynasty. But no, he was not right about the actual pharaoh! It was not Amenemhet III after all, but one of his predecessors in the same dynasty, and this fact must have generated Amenemhet III’s own obsession with sphinxes. The final piece of the jigsaw has been inadvertently supplied by an Egyptologist named Biri Fay. Dr. Fay published in 1996 a large and impressive book, full of wonderful photographs, entitled *The Louvre Sphinx and Royal Sculpture from the Reign of Amenemhat II*.<sup>17</sup> In this book, which is a truly amazing work of detailed analysis of a large sphinx in the Louvre in Paris (see figures 4.26 and 4.27), Fay discusses the fact that this sphinx bears the face of an earlier Amenemhet, not the one considered by Borchardt. The pharaoh she has in mind is Amenemhet II (reigned 1876–1842 BC), the third king of the Twelfth Dynasty, who reigned for thirty-four years, and who was the great-grandfather of Amenemhet III, who was its sixth king. Amenemhet II shifted his interest back toward the area of Giza, though most of his dynasty showed little interest in the region, preferring the region of the Fayyum farther south, where his father’s and grandfather’s pyramids were built. He built his own mud-brick pyramid at Dashur, which is not far from Giza. (The art of building pyramids in stone had been lost by this time.) And as we shall see, he seems to have undertaken something at Giza itself that was far more important.



Figure 4 26. A view of the face of Amenemhet II on Sphinx A23 taken at an angle (*The Louvre, Paris*)



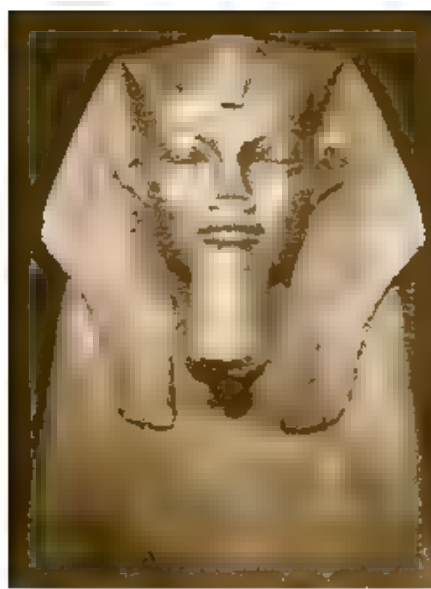


Figure 4.27 The Sphinx A23 as King Amenemhet II, in the Louvre. His name appears in a cartouche on his chest. Note that the patterns of the stripes on his *nemes* headdress are identical to those of the Great Sphinx of Giza and as shown in the drawings in appendix 2 pages 510 and 511. This pattern was used only during the Twelfth Dynasty. (*The Louvre, Paris*)

Amenemhet II seems to have been a restless fellow. He led an expedition to Nubia in search of gold when he was young. During most of his reign, there was a major emphasis on foreign relations, and he strengthened Egypt's presence and reputation in the area now known as Lebanon, particularly at the city of Byblos, which was a traditional Egyptian center. Certainly, Amenemhet II was someone who looked outward and was not content to concern himself with only internal affairs. A considerable number of administrative documents survive from his reign, and also detailed annals of a portion of his reign were discovered carved into some reused stone blocks, one of which was only discovered in 1974. As the Egyptologist Jaromir Malek said: "The text appears to have been transferred to a temple wall from a 'day-book' written on papyri, and is the most detailed example of Egyptian annals (*genut*) known. . . It will take a while to translate and understand it."<sup>18</sup> That was in 1992, and we are still waiting for the translation and understanding to be published. However, the annals clearly show Amenemhet to have been preoccupied with visiting religious sites and cult centers and demonstrate that he had a fascination with ancient monuments. He described himself as "beloved of Atum" and "given life like Ra eternally." Both descriptions have a potential connection with concepts related to the Sphinx, which was often viewed as having a connection with the creator god Atum, as has already been mentioned and is discussed further later on in this book, and which faced the rising sun of Ra eternally.

As part of her study of the stone sphinx statue in the Louvre, which bears the face of Amenemhet II, Fay does not mention, and shows no knowledge of, Ludwig Borchardt's article that we have just been considering, and which in translation forms appendix 2 of this book. She mentions other books by Borchardt, but it appears that she genuinely did not know that Borchardt had ever written a study of the Great Sphinx. If she had known of it, she might have drawn some rather different conclusions on certain matters. But fortunately we know it, so all is well.

The first thing that is evident from Biri Fay's book is that the triple-stripe design found on the *nemes* headdress of the Great Sphinx, which Borchardt had thought was used only at the time of Amenemhet III, was also used by, and apparently even introduced by, Amenemhet II (see figure 4.27). In fact, it prominently appears on the Louvre Sphinx, which is definitely known to bear the face of Amenemhet II. And furthermore, the eye-paint stripes are also there (see figure 4.28). These facts had been unknown to Borchardt.

So it is clear to us (but not to Biri Fay, who did not know of them) that all the arguments Borchardt so carefully marshaled in favor of Amenemhet III also apply to Amenemhet II. However, not for one instant does Biri Fay suspect that Amenemhet II's face might be the face that appears on the Great Sphinx. That is because she believes the conventional opinions and does not even think to challenge them. She accepts what is "known."

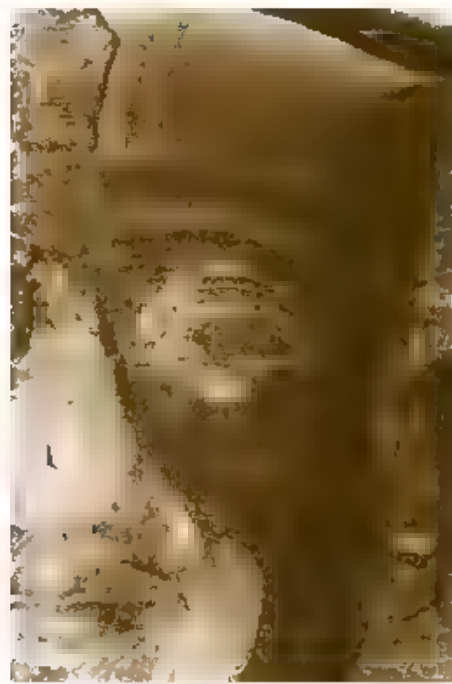


Figure 4.28. A close-up photo of the left eye and eyebrow of the face of Amenemhet II on the Sphinx A23, showing the eye paint and the *nemes* stripes discussed by Ludwig Borchardt in appendix 2. (*The Louvre, Paris*)

Biri Fay not only made a direct comparison between the face of the Louvre Sphinx and the Great Sphinx, *she even published photos of the two faces opposite one another in her book*, stressing their similarities! You might wonder how anyone who went this far could possibly not "see" the point! And yet she did not. Here is what, astonishingly, she actually says:

Although a stylistic comparison of the Giza and Louvre sphinxes must be restricted to their heads, similarities are profound. Both [kings'] faces are broad and full, and slope downward over the cheekbones (Plates 68 and 69) [her plates mentioned a moment ago]. Each *nemes* is wide across the wings, set low on the forehead over the brows, and shallow at the crown. On both sculptures, temple folds are rounded as they near the forehead. . . . The pleating pattern found on the *nemes* of the Louvre sphinx—a fine triple-stripe executed in rounded, raised relief, with a wide stripe and a narrow stripe to each side—is rare in the Old Kingdom [or absent!], but the treatment is similar on the Giza Sphinx (Plates 68a, 69a). In both cases, the stripes on the wings of the *nemes* fan upward behind the ears. A broad uraeus hood, with a wide ventral column, appears on both sphinxes (Plates 68–69). . . . The eyes of both sphinxes are strikingly similar. Not only are they large in proportion to the face, but their shapes, with horizontal lower-eye rims and semi-circular upper rims, are closely related. Correspondence between the two works in the eye region extends to the shape and proportion of the wide brows, and broad cosmetic lines (Plates 68–69). Furthermore, in each case, the brows dip slightly at the root of the nose and extend horizontally over the eyes.

Among the most distinctive Louvre sphinx features is the broad mouth, the lips do not meet at the corners, but are instead embraced by a semi-circular muscle at each side. Despite damage suffered by the Giza Sphinx, its width is obvious, and close examination also reveals the muscled treatment of the



corners. . . . Comparison of three-quarter views further reinforces the resemblance of the Giza and Louvre sphinxes. . . The fullness of the face across the cheeks and the slope beneath the eyes above the cheeks is analogous. As in frontal views, the eyes of both sphinxes are closely comparable, with horizontal lower eye rims and upper rims arched to a semi-circle. Furthermore, cosmetic lines embrace the sharp outer canthi [*canthus* is an anatomical term meaning the angle formed by the meeting of the upper and lower eyelids at either side of the eye], extend horizontally, and flare at the ends similarly on both sphinxes. Even though the ears of Louvre A23 are more damaged than those of the Giza Sphinx, it can be seen that the narrow helix and the antihelix [the *helix* is the outer rim of the ear and the *antihelix* is the curved elevation of the cartilage of the ear] branches compare well on both sculptures. Key similarities between the two works raise the question of whether Amenemhat II's sculptors also may have copied the maned shoulder style from the Giza Sphinx.

Plate 69c gives final demonstration of Amenemhat II's dependence on the Giza Sphinx for his own image. Images of both sphinxes laid over one another reveal that the sculptures are almost identical. . . Amenemhat II used the Giza Sphinx as a model for his own sphinx.<sup>19</sup>

Yes, reader, your optic nerve is not faulty, nor has your retina become detached. No, you have not lost your senses either. What you think you read is actually what you read. Yes, you have just read a meticulous comparison of the identical faces of the Sphinx of Amenemhet II in the Louvre and the Great Sphinx of Giza by an expert analyst: she has gone to great lengths to prove that the two faces are identical, and yet *she does not "see" what this means!*



Figure 4.29 The face of the Sphinx of Giza, as reproduced in Biri Fay's book *The Louvre Sphinx and Royal Sculpture from the Reign of Amenemhat II*, Mainz, 1996, as plate 68a. The photo credit reads "After Uni-Dia Verlag 10049 "

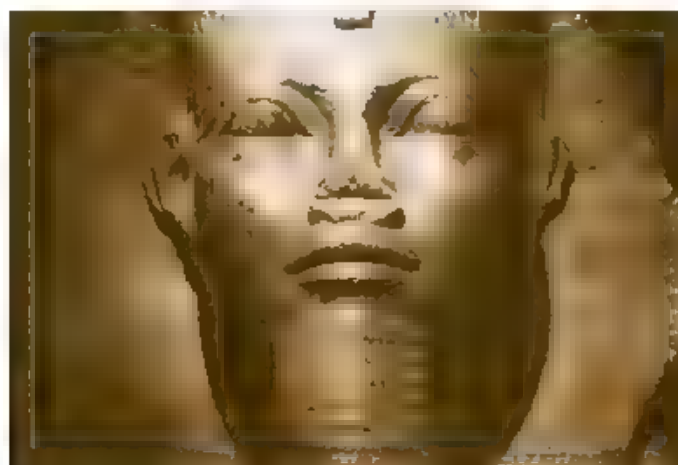


Figure 4.30. Amenemhet II's face on Sphinx A23, as seen from below eye level. This approximates more nearly the view of the face of the Sphinx of Giza as we see it today, from below looking up. (*The Louvre, Paris*)

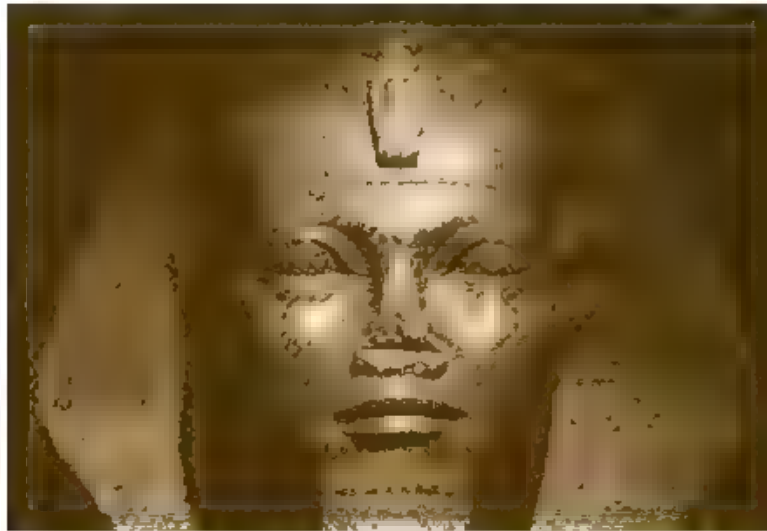


Figure 4.31. Amenemhet II's face on Sphinx A23, seen head-on at eye level, the view that we have not had of the Great Sphinx of Giza since 1936, when it was fully excavated and we could no longer stand at that height. (*The Louvre, Paris*)



Figure 4.32. The face of Amenemhet II can be seen like this nowadays only from inside the Sphinx Temple. In front is the western wall of the Sphinx Temple. (*Photo by Robert Temple*)

Imagine me telling you that I had gone to Buckingham Palace and seen a woman who looked like Queen Elizabeth. I describe to you very carefully how her hair is exactly the same, she speaks like her, has the same expressions, has a lot of little corgi dogs standing round her ankles, has the same regal air, and could be her twin, she is so similar. I then go on to say to you very earnestly, apparently clueless as to any other possibility, that this woman has clearly modeled herself on the queen and made every attempt to resemble her and imitate her, and has even gone so far as to do so in the queen's own palace, and has borrowed the queen's own dogs to make her act of impersonation more convincing. What would you conclude about me?

There are some paranoid schizophrenics who see connections between everything. They think that if a bus passes them on a street corner, it is a "sign." They think that people who have no connection whatsoever resemble one another. But I would postulate an opposite condition: there are some people

who are so wholly in the grip of secondhand thinking that all their perceptual abilities, the evidence of their own eyes and ears, are powerless to alert them to anything that challenges conventional reality. Yes, there are actually people in existence who can describe point for point the precise resemblance of the faces of two sphinxes but do not even notice that this means that they *are* the same.

Biri Fay, having proved the identity between the faces of the two sphinxes, then goes on to insist that *Amenemhet II had a face carved for himself on his sphinx statue in the Louvre that would resemble precisely that which was on the Great Sphinx of Giza.*

Sedatives, anyone?

So now we have the answer to whose face is on the Great Sphinx. The face is that of the pharaoh Amenemhet II of the Twelfth Dynasty, who reigned from 1876 to 1842 BC. (And by the way, his ears were the same as his great-grandfather's.)

Now let us consider what the Sphinx was before it became a monument to one pharaoh's vanity. In the next chapter there is a completely different interpretation of the nature and purpose of the monument from any that has ever been advanced (except by myself in a brief preliminary account in 1998).<sup>20</sup>

## THE SPHINX AS ANUBIS

The first time I went to Egypt and saw the Sphinx with my own eyes, I was deeply shocked. Photos of the Sphinx are misleading in several respects. We have already seen in the previous chapter how hard it is from a photo to get a true impression of the proportion of the head to the body. And when I first saw the Sphinx, the ridiculously tiny head on the huge body was naturally one of the things that most shocked me. But what struck me even more was that the Sphinx did not look at all like a lion. I had always been told the Sphinx had the body of a lion with the head of a man, and I accepted that account as being true, as everyone does, since who are we mere mortals to challenge such a fundamental “truth” that “everybody knows”? It had not even occurred to me that there could be anything wrong with this “truth.” But now that I stood there staring at the Sphinx with my own eyes, I failed to see a lion anywhere. No matter how hard I looked, I could not see a lion.

I rubbed my eyes, I examined my conscience, I craned my neck, I stared and stared, thinking that the obvious would soon become apparent to me if I just looked harder. Surely there was a lion there somewhere, as “everyone knows” that there is a lion there. We have all been told that there is a lion there since we were children. There is no one who does not see a lion there. We all know that. *But there was no lion.*

Olivia looked and looked, and there was no lion for her either. But she is rather more cautious than I am, and she wondered if perhaps we lacked some faculty that other people have, an *ability to see lions*. Were we somehow lion-dyslexic? Was this a failing of our own? Had we not consulted properly? Was this somehow our fault? But she has a good eye and notices shapes and forms and recognizes silhouettes, and her reaction was that this shape was not that of a lion. She thought it looked more like a crouching greyhound.

This was one of those disillusioning moments in life, like realizing that there is no Santa Claus, when all your hopes and dreams are stripped away from you and you are forced to face a hostile reality. There we stood, sadly looking at the Sphinx that “everybody knows” is a lion, and we could see plainly that it was no such thing. We felt very lonely, and I knew that when I eventually came to write about it, I was going to have another one of those tedious and hard battles that I am always having when I try to point out that the emperor has no clothes. Because nobody wants to hear, and everybody tells you to shut up and calls you a troublemaker. And although I don’t care whether I am called names, and just laugh, it does get a bit wearing sometimes, like being in a ferocious gale, so that you are always pulling your scarf tighter to keep out the wind.

Well, there we were, stuck with the reality that wouldn’t go away. The Sphinx was *something*, but it



certainly wasn't a lion.

So what was it? It had four legs and it was lying on its belly, in a position that is generally called recumbent, or to use a term from heraldry (whose terminology as used in English derives from Norman French after the conquest of England by William the Conqueror, who came from Normandy), *couchant*. In discussing the iconography of the Egyptian gods portrayed as animals, it is common for Egyptologists to refer to a standing animal as "an animal *passant*" and a recumbent animal as "an animal *couchant*." People who are not familiar with these heraldic words need to have that explained to them. What kind of recumbent beast was the Great Sphinx *couchant*, then? One can't tell much from the paws, because they had been so mangled by restoration work (much of it apparently in Roman times) and covered all over in small stone blocks that they could give no reliable clue as to what type of creature this might be. None of the original carved portion of the paws is any longer visible, so what they looked like originally can be determined only by inference or by guessing.

The thing that struck us as most obvious and most peculiar was that the back of the Sphinx was entirely straight, that is, its spine was absolutely flat. It did not rise anywhere, whether in the rear or in the front. It was *flat*. (This is clearly shown in figures 1.11, 1.33, 1.34, 1.38, 1.39, 2.16, 2.18, 2.19, 2.26, 3.10, 3.15, 4.1, and 5.11 ) All Egyptian statues and pictures of lions show the back rising sharply in front, to indicate the massive chest of a lion, and generally a mane is also clearly shown, as well as muscular haunches. See figures 5.1, 5.2, 5.3, 5.4, 5.5, and 5.6 for examples. But the Sphinx has no massive lion's chest, no rising line of the back to a higher neck, no bulging muscles, and certainly no trace of a mane. Figure 5.5 shows what a real crouching lion looks like, and it is clear to anyone that it has no similarity whatsoever to the Sphinx.



Figure 5.1 The design carved into an ebony tablet, which was found in the tomb of the First Dynasty king Den, who is seen seated on a throne within a shrine at the top center of the picture. At top right, the same king is seen running as part of the Sed Festival for renewing the magical power of his kingship, where he had to prove his vitality and virility by running back and forth within a sacred enclosure during the festival carrying his royal insigniae and wearing the royal crowns and a ceremonial kilt. Behind the seated king, a Horus falcon stands on a rectangle called a *serekh*, the upper part of which contains the name of the king, Den, shown by two hieroglyphs (the wavy line is the hieroglyph for the consonant *n*). This is from plate XV of Flinders Petrie's *The Royal Tombs of the First Dynasty*, Part 1, 1900. King Den's tomb contained "a great number of tablets of ivory and ebony—twenty tablets are known from this tomb" (Petrie, p. 11). The recumbent lion, whose forepart is depicted at lower left, could not be further from the conception of the Sphinx of Giza. The lion was always conventionally portrayed, throughout the whole of Egyptian history, as having a massive chest and mane.



Figure 5.2 Detail of the lion seen in figure 5.1.



Figure 5.3. Here are seven examples of how lions were actually depicted by the ancient Egyptians prior to the carving of the Great Sphinx of Giza. These are small ivory carvings of lions that are thought to have been used as gaming pieces. They all date from the First Dynasty, the date of which is generally given as approximately 3050–2850 BC. All Egyptologists believe this to be well before the date of the carving of the Great Sphinx, which is generally attributed to the Fourth Dynasty (thought to have been approximately 2640–2510 BC). In other words, these lions are all at least two hundred years older than the Great Sphinx, if conventionally accepted dates are correct, and some may be four hundred years older. These lions, and others like them that have been recovered from royal graves, are known to have been carved over a span of several centuries. They prove that there was a well-established tradition in Egypt of how lions were to be represented in art. These lions are all zoologically accurate, as Egyptian art always was. Lions have massive chests, their backs rise steadily from their rumps into a thick, maned neck. We all know what lions look like, and so did the Egyptians of the First Dynasty. These ivory figurines prove that anyone who tries to maintain that the Great Sphinx is intended to represent a lion because the earliest Egyptians were naive in their art and showed them like that is wrong. These lions were all excavated beside an early temple at Abydos by Sir William Flinders Petrie in 1902/1903, and published in plate 3 of volume 2 of his book *Abydos, 24th Memoir of the Egypt Exploration Fund*, London, 1903.



Figure 5.4. This is a detail of a carving at the Temple of Amun at Karnak. It shows the traditional form in which a lion's head and forelegs were represented in Egypt, with massive mane, wholly unlike the Sphinx of Giza. (Photo by Robert Temple)



Figure 5.5. This limestone votive figure of a lion was excavated between the forelegs of the Sphinx in the Sphinx chapel by Selim Hassan in 1936. It is plate XXIIa (following p. 50; the discovery is described on p. 33) in *The Great Sphinx*, figure 4 (opposite p. 36) in *Sphinx*, and figure 4 (following p. 24) in *Le Sphinx*. This depiction of a lion is so dissimilar to the Giza Sphinx that it shows strikingly how nonleonine the Sphinx's body is according to Egyptian artistic traditions.



Figure 5.6. This ancient Egyptian drawing of a lion with its accompanying measurements marked off by the artist gives conclusive evidence that lions had a canonic mode of portrayal in Egyptian art, with a sharply rising neck, utterly unlike the shape of the body of the Sphinx, which cannot therefore have been intended to represent a lion. Lion bodies were also squat in contrast to elongated dog and jackal bodies like that of the Sphinx. The drawing also shows how conscious the Egyptians were of correct proportion in representations of animals, and on this basis alone, it is inconceivable that the tiny pimple of a head on the vast body of the Sphinx of Giza could possibly be original. (Reproduced from Richard Lepsius, *Der wichtigste Urkunden des Aegyptischen Alterthums*, Leipzig, 1842, Plates (Atlas) Volume.)



Figure 5.7. The goddess Sekhmet (She of Power), with a solar disk on her head. This statue, covered in sheets of beaten gold, is of New Kingdom date. It is on display in the Egyptian Museum at Cairo. Sekhmet embodied various attributes. On the one hand, she presided over healers and protected women. On the other hand, she could be intensely destructive, especially to the wicked. She embodied the essence of the fiery midday sun, the destructive power of solar rays, and the hot breath of the burning desert, and she acted as a burning Eye of Ra to destroy those who mocked the sun god. It was necessary to keep on the right side of



her, for her destructive powers were awesome. She loved Cosmic Order and detested evil and was known as the Lady of Terror, feared by the wicked. She was the special protectress of the pharaoh in battle and was sometimes viewed as his nurse or even as his mother. The pronounced leonine characteristics of the head and neck of Sekhmet are far from what we see on the Sphinx. This statue may have represented a priestess of Sekhmet wearing a Sekhmet head, or it may represent the goddess herself.  
(Photo by Robert Temple)

So why do people call this statue a lion? It has no leonine characteristics at all.

The Sphinx was thought of as having the body of a lion for a very long time indeed, and it was the Egyptians themselves who started this misconception. When the Sphinx was cleared of sand during the New Kingdom by the pharaoh Thutmosis IV, circa 1400 BC, the Egyptians of that time thought they saw a lion. So from then on, it was assumed by many people that the Sphinx was a creature with the body of a lion and the head of man, much as people assume today. This fallacy is thus not a modern one. It has been believed for 3,400 years. But just because something is believed for 3,400 years does not mean that it is correct. For many thousands of years it was believed the sun went around the Earth, and that was not true either.

Many people have commented on the strange fact that there is no mention of the Sphinx in very early times in Egypt. To give a recent example, Mark Lehner has said in *The Complete Pyramids*, "There are no known Old Kingdom texts that refer either to the Sphinx or its temple"<sup>1</sup> But I would say that the reason for this is that people have been looking for the wrong things. Texts referring to a lion with a man's head will not be found, because that is not what the Sphinx was.

This opens up all kinds of possibilities. If the Sphinx was not really a lion with a man's head at all, then of course there would be no Old Kingdom references to such a thing. We have already seen that the man's head was probably a recarving during the Middle Kingdom. So in the Old Kingdom, what we have to do is look for references to *something else* that might be the Sphinx, and which is neither a lion nor an animal statue with a man's head.

We will see that there are numerous references to *something else*, which was a gigantic creature that is sometimes specifically said to be at Giza. But it was not a lion, and it did not have the head of Amenemhet II, who was not born yet!

But before we turn to ancient Egyptian texts, we need to consider what the Sphinx actually is, or should I say was, before it had its head recarved. In the previous chapter I said that I believe the Sphinx once had an animal head. But clearly I do not believe it had a lion's head, since I do not believe it was ever meant to represent a lion. Whatever the head was, it needed to be in the correct proportion to the body. So we come to the question: What beast could this be, lying on its belly, guardian of the necropolis of Giza?

The usual guardian of the necropolis in Egyptian tradition was the god Anubis, and he was represented as a dog, or jackal, or jackal/dog. (See figures 5.18 and 5.9.) Anubis is the Greek name of the god called in Egyptian Anpu, but since everyone uses the form Anubis, we shall call him Anubis. In fact, there is no real agreement as to what precise creature Anubis is. Some think that there was a wild dog in those days that looked like this, or the creature may have been a cross between a jackal and a dog. In the thousands of years that have elapsed, it may well be that this precise breed has disappeared. There is a surviving dog today called the pharaoh hound that is close to Anubis in appearance, and the pharaoh hound was long presumed to be descended from those ancient dogs representing Anubis. People who have pharaoh hounds are very enthusiastic about them; there are even pharaoh hound clubs and newsletters and so forth. Anyone curious about them only needs to enter "pharaoh hound" into an Internet search engine. However, in 2004, a study of dog genetics suggested that pharaoh hounds are not related to ancient



Egyptian dogs.<sup>2</sup>

The Egyptologist Alberto Bianchi has actually published an article claiming that Anubis was a wild dog, and he says, “The image of the sitting dog as Anubis protects the deceased.”<sup>3</sup> He says the position is a natural posture for the wild dog. “As is common with dogs, they adopt when they are resting a characteristic position consisting in projecting their four legs forward, parallel to one another, keeping at the same time an attitude of watchful attention. Surely, the observation of this peculiarity on many occasions, mainly by the people working in the cemeteries, resulted in its being given a transcendent meaning, linking it to the protection of the dead and the burials.”<sup>4</sup> Certainly this is the precise position of the Sphinx, which thus conforms exactly with the natural position of the Egyptian wild dog as a guardian.



Figure 5.8. A depiction of a crouching (*couchant*) Anubis carved in granite, in a block surviving among the ruins of Memphis. It dates from the period of the New Kingdom and shows Anubis in his characteristic pose. (Photo by Robert Temple)



Figure 5.9. This photo of a crouching Anubis resembles what the Sphinx of Giza originally was, although the Sphinx of Giza has a straighter back. However, as an idea of what the Sphinx of Giza originally looked like prior to 2000 BC, this gives a very good impression. This is a wall carving at the Temple of Seti I at Abydos, and therefore dates from the New Kingdom, at least a thousand years later than the time of the carving of the Sphinx of Giza. (Photo by Robert Temple)

Bianchi further tells us (I have omitted his many references):

The jackal is usually considered by some authors as the Anubis canis, but this assumption must be discarded now because of its inconsistency. L. Keimer emphatically denies the existence of the jackal in Egypt. . . . E. Meyer wrote that the Anubis animal was a dog. . . . The Greeks did not know about the existence of the jackal. . . . E. Meyer took from inside a statue of Anubis found in the XVII nome [a geographical district] of Upper Egypt the mummy of a dog. . . . A. Gardiner in his Egyptian

Grammar questioned the interpretation of the sitting dog as a jackal in E17 . . . In fact, zoology has established differences in size and skull shape between the archetypal dog and the jackal which can be appreciated with a simple eye inspection.<sup>5</sup>

So we see that many experts have suspected that Anubis was not a jackal at all, but a wild dog. In the discussions that follow, including various quotations from authors, we should keep this in mind, and mentally correct the word *jackal* to *wild dog* when we are considering Anubis.

As I looked at the Sphinx that first time, noting the straight back of the creature and the complete absence of leonine features or characteristics of any kind, I was struck by the fact that I appeared to be staring at a dog. It looked like a dog to me, and it looked like a dog to Olivia. Perhaps this is because we are dog-lovers. However, if we had been cat-lovers, we would have thought no differently. There it sits, crouching on its belly, and it is a dog. And what is more, Anubis was frequently represented in precisely that posture throughout the thousands of years of Egyptian art. Anubis recumbent, or Anubis *couchant*, is one of the most famous of all ancient Egyptian art motifs. A magnificent small statue of the recumbent Anubis was recovered from the tomb of Tutankhamun.

In the countless images of the recumbent Anubis, he lies in precisely the manner of the Sphinx. Anubis always has a long tail, and the Sphinx has one. But because the jackal/dog was a slender creature, he is normally shown with a hollow beneath the lower part of his belly, where his slim form curves upward. However, in the case of the Sphinx, which was carved out of the solid rock, a portrayal of this feature would not have been possible without boring a large hole beneath the haunches and seriously weakening the statue. On the other hand, it is possible that the fissure at the haunches where the shaft had been bored and that is now filled with cement may have shown some sort of Anubis-like indentation, which contributed to the weakening of the stone at that point. If you look at the photo of the Sphinx in figure 1.31, taken before Baraize filled the fissure with modern cement, you can see that the body does seem to narrow somewhat at that point. But it is now difficult to be certain of such a feature, with so much “restoration” having taken place. The colored plotting of repair blocks published by Mark Lehner indicates that the area is now completely covered with repair blocks, with none of the original stone showing, and that many of these date from the 1960s–1970s.<sup>6</sup> Since no one ever seems to have suspected that the Sphinx was Anubis before, it is evident that no one ever gave any thought as to whether any hollowing of the sides existed here originally. But if you look at the plan of the Sphinx from the air, you can see that the body clearly narrows at the haunches on both sides in the manner of Anubis. (See appendix 5.)



8. VASE OF ZER

Figure 5.10. This detail of an incised carving in a stone vase found in the tomb of King Zer (Djer) of the First Dynasty shows a recumbent Anubis and demonstrates how unlike a lion the crouching dog was from the earliest depictions in Egyptian art. The straight back resembles the Sphinx.

Because the Sphinx has definite canine features and no leonine features, the burden of proof is shifted to those who wish to maintain that it is a lion to establish their case. Otherwise we must presume it is a

dog. But since there is nothing anyone can bring forward in favor of the Sphinx being a lion but hearsay (i.e., “consensus reality”) and the late tradition from New Kingdom times of 1400 BC, when nothing was remembered about the true nature of the Sphinx in Egypt, the case for the Sphinx being a lion is lost. That this has not been recognized for 3,400 years is logically irrelevant: the principles of logic, Occam’s razor, and common sense all dovetail in favor of the Sphinx being a dog. The fact is that 3,400 years of “the opinion of the herd” is of no more consequence than a flyspeck when it comes to the determination of the truth. Human beings are notoriously unobservant and poor at using their brains, and they tend to allow their thinking to be done for them—second-hand thinking, such as that which is provided for them by numerous churches, religions, political parties, sects, and cults. Humans think in packs, just as wolves run in packs. A human often likes to plug his or her hard disk (“brain”) into a network and have all the thinking done remotely. It so much easier.



Figure 5.11 At left we see a redrawing of the shape of the Sphinx as it would have appeared in the Old Kingdom, when it was a crouching Anubis. The exact profile and proportions of the Sphinx have been incorporated into the drawing, and the head of Anubis has been added in correct proportion to it. The recarved head of the Sphinx with a pharaoh's face fits within the neck of what I believe to have been the original whole statue. At right is another redrawing of the shape of the Sphinx, this time in full-face view, and once again, the recarved head of the Sphinx with a pharaoh's face fits within the neck of the original statue. (*Drawings by Daud Sutton*)

We have already seen in figures 3.15 and 4.1 the disproportion of the Sphinx's head to its body. Now, in figure 5.11, we see the same side view of the Sphinx with a head of Anubis drawn on top in proportion to the body, and we can see that the existing head fits well within the neck of the dog. We can also see the same in a front view. The side folds of the headdress are well inside the span of the shoulders, whereas for a head in correct proportion, they would be expected to spread widely to either side of the shoulders. From these drawings, it is clear that the existing head could easily have been carved out of the neck of Anubis. And indeed, the proportions are such that in order to do this, a head of approximately the size that we now see would have resulted.

But one question that arises is this: Would anyone have dared to commit such an atrocity as to cut off the head of Anubis? Wouldn't that have been considered an extreme impiety? Doubtless it would, and even the most megalomaniac of pharaohs might have hesitated to do it. We have already seen in chapter 3 that in oral folklore a tradition of the head having been cut down still survives, so it must have made quite an impact on the locals to see this happen, a shock that survived in local lore for millennia. (We should remember that the very locals who said that the head had been cut down had never seen the body, which further confirms the accuracy of their tale, since they themselves were unaware of the disproportion between the head and the body, as they had never actually seen the body.) So what I believe may have happened is that when the Sphinx/Anubis became covered up with sand after the end of the Old Kingdom, in the long, dark days known as the First Intermediate Period, when civilization largely collapsed and there was no law and order and barely any government at all for a century and a half, the head of Anubis must have become damaged. Perhaps it was even vandalized. It must have been easy for a head with a long pointed nose and high pointed ears to be damaged, especially when the sand had risen up to the neck.



We know that the stone of the Sphinx is fragile in places, and a large piece of the Sphinx fell off into the Sphinx Pit in the 1990s. If the ears and nose of Anubis were substantially damaged, whether by weakness of the stone or by intention, a reshaping of the head might have been seen as the only sensible course of action to take by the time of the Middle Kingdom. So we must not assume that Amenemhet II was so crazed with egotism that he smashed the face of Anubis. His egotism may have been restricted to putting his own face onto a statue whose original face was so damaged that it had to be replaced with *something*.

We are encouraged to think along these lines by an article published by Zahi Hawass in 1992, in which he writes:

In my opinion, it seems most likely that the Sphinx was abandoned at the end of the Old Kingdom and then plundered in the First Intermediate Period, ca. 2150–2040 BC. This conclusion is suggested by the evidence of plundering on the Giza Plateau at this time, the scope of which could arguably have also affected the Sphinx. . . . Evidence from the lower temple of Khafra [Chephren; Hawass is referring to the Valley Temple] supports the hypothesis that the monuments on the Giza plateau were viciously destroyed at the end of the Old Kingdom. The temple was certainly robbed, and most of the statuary was smashed, as the many statue fragments in the area testify. The careful burial of the diorite statue of Khafra found in the pit in the antechamber suggests an attempt to protect it from plunderers.

All the cited evidence suggests the monuments of Giza were plundered in the First Intermediate Period. The Sphinx was most likely also abandoned at that time.<sup>7</sup>

I believe that Hawass is absolutely correct in his belief, and that the Sphinx was very seriously damaged and mutilated during this period. The head of Anubis would have been an easy target and was bound to have been vandalized. The ransacking of the adjoining temples, the smashing of all the statues in them, could hardly have taken place while the Sphinx remained untouched. So we should not condemn Amenemhet II unreservedly for putting his face on the Sphinx, considering that it was probably impossible to restore the head of Anubis correctly.

The so-called Inventory Stela excavated at Giza preserves a tradition of the need for repairs to the Sphinx in the early period, by claiming in its text that Cheops in the Fourth Dynasty *repaired* the Sphinx.<sup>8</sup> (The Inventory Stela may be seen in figure 5.12, and a diagram of its contents may be found as figure 5.13.) That claim would indicate the Sphinx being repaired as early as 2500 BC! If the Sphinx needed repair that early, imagine how much more repair it would have needed five centuries later, in Amenemhet II's time. But all Egyptologists get very upset these days when one quotes the Inventory Stela. Although many distinguished Egyptologists of the early twentieth century accepted its evidence and believed that the Sphinx was so old that Cheops had repaired it, today we realize that the Inventory Stela is a much later stela, and its evidence about that point cannot be reliable. But although the stela is clearly of a late date (we think circa 1000 BC) in terms of its carving, that is an insufficient basis for dismissing its text as being of the same age. The texts of the Taharqa edifice (King Taharqa, a Nubian pharaoh of Egypt of the Twenty-fifth Dynasty, ruled 690–664 BC) are also late but are not only accepted by everyone as being copied from texts of much earlier date, but many of them have been proved to be direct quotes from texts also inscribed in a chapel of the earlier pharaoh Rameses III (ruled 1198–1166 BC according to one chronology, or 1183–1151 BC according to another), five hundred years earlier, and who in turn must have obtained them from papyri of a much earlier date still.<sup>9</sup> There are countless examples of texts being recycled throughout the ages in Egypt, and the text of the Inventory Stela is not necessarily entirely a late text just because the stela is late. Things are not as simple as that. But on the other hand, it is not certain

that it was Cheops who really restored the Sphinx in the manner described (although there may have been a surviving tradition that Cheops had also restored the Sphinx even earlier), and it was possibly a New Kingdom pharaoh rather than Cheops who is referred to in the text, with the name changed. The main point is that there was a definite tradition of repairs to the Sphinx, which we know in any case to be true, since we have clear proof that Thutmosis (Thothmes) IV cleared and repaired the Sphinx, as we have seen in an earlier chapter and which is recorded in his Dream Stela, a fact accepted by everybody today.

But before we dismiss entirely the idea that the Sphinx was actually repaired by Cheops, let us keep in mind that there are many Old Kingdom repair blocks on the Sphinx, some of which are clearly visible in figures 5.14 and 5.15. These are the only really good repair blocks ever used on the Sphinx, and they have survived for about 4,500 years. All subsequent ones, including modern ones, are very inadequate. Who put these on the Sphinx? Maybe it was Cheops after all. It does look like Fourth Dynasty work. So what is the real answer to the age of the Sphinx, if it was *repaired* in the Fourth Dynasty? Some Egyptologists who admit the age of those blocks claim that they were put on the Sphinx at the time of its carving to remedy deficiencies in the rock. But that seems rather a tepid argument, and not particularly convincing. It is more likely, in my opinion, that Anubis was already there at the time of Cheops. But that is merely an opinion, and we shall see what is revealed in the future about the date of the Sphinx. I have worked on an archaeometrical dating project at Giza with the permission of the Egyptian Supreme Council of Antiquities, but as the results are not published yet, I cannot say more at the present time. Some indications of the results at Giza will be given in my next book, *Egyptian Dawn*. They are very surprising, and include dates for the so-called Osiris Shaft beneath the Chephren Causeway, which is 150 feet beneath the surface.



Figure 5.12. A photograph of the famous Inventory Stela, excavated at Giza. This stela includes a text claiming to date from the Old Kingdom, which describes the topography around the Sphinx. The stela itself is much more recent, perhaps from the Twenty-sixth Dynasty (664–525 BC). No one is certain whether the text is authentic and was copied onto this stela or whether it was written at the time of the stela, perhaps garbling some of the information. This photo is plate LV, following page 140 in Selim Hassan's extremely rare excavation report on the Sphinx, *The Great Sphinx and Its Secrets*, Government Press, Cairo, 1953. A diagram of what appears on this stela is shown in figure 5.13 below.

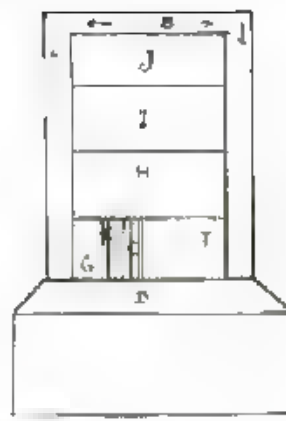


Figure 5.13. This diagram shows the locations on the stela where the different blocks of text and illustrations occur on the Inventory Stela. This is figure 80 on page 113 of Selim Hassan's *The Great Sphinx and Its Secrets*, Cairo, 1953. The stela lists the figures of the gods found by Pharaoh Cheops (Khufu) when he discovered the Temple of Isis at Giza. The Temple of Isis that is known to archaeologists (see figures 1.24, 1.25, and 1.27 on pages 30 and 31) is much later than the time of Cheops, so either there was an earlier Temple of Isis at Giza or this is a late text (perhaps from the seventh century BC) based on garbled information. The inscription along the right edge, beneath the downward-pointing arrow, says "Live Horus Medjdu, the King of Upper and Lower Egypt, Khufu, given life [i.e., deceased]. He found the House of Isis, Mistress of the Pyramid, beside the House of the Sphinx, on the north-west of the House of Osiris, Lord of Rostau, and he built his pyramid beside the temple of this Goddess." The House of Osiris is thought to be what we now call the Valley Temple at Giza, either before it was usurped by Chephren and filled with statues of himself (if he did usurp it) or otherwise what it became after Chephren's statues were smashed and it reverted to a religious rather than a royal use. The bottom register of the panel then continues, "The Place of the Sphinx, Horemakhet, is on the south of the House of Isis, Mistress of the Pyramid, and on the north of Osiris, Lord of Rostau." This information is so specific that it seems impossible for the House of Osiris of Rostau to be anything other than the Valley Temple of Giza. These texts are so interesting that, whatever their age, we are glad to have them.



Figure 5.14. This photo of part of the southern rump of the Sphinx is what the French might call a *mélange des pierres*, or we could say "a stone cocktail." Just about every kind of patching and reconstruction stone that we could imagine is evident here, the palest ones being the newest. Underneath we see what are believed to be Old Kingdom repair stones. But this raises the question. If it was thought necessary to *repair* the Sphinx in the Old Kingdom, how old really is the Sphinx? We see here that later repair stones were laid over the Old Kingdom ones as an entire second skin, and this could have been done anytime during the Middle Kingdom, New Kingdom (after Thutmose IV cleared the structure of sand), Ptolemaic, or Roman period. The large second-skin repair blocks, especially the long curving stretched ones, are too sophisticated for Roman repairs and must be earlier, since the Romans used very small stones similar to the modern ones. One wonders just what really is beneath all these stones, and where the carved body is. (Photo by Robert Temple)

In 2005, Terence Du Quesne, with whom I enjoy a friendly and congenial acquaintance, brought out a definitive book on the history of the iconography and inscriptions relating to the god Anubis from the beginnings of Egyptian civilization (what is called the Archaic Period) up to approximately 2000 BC (the date at which the Middle Kingdom began). This book deals not only with Anubis per se, but also with variant forms of Anubis and other jackal deities. It is called *The Jackal Deities of Egypt* and is the product of a lifetime's study of the subject. Like myself and Olivia, Terence is a real dog-lover! We will consider this book as well as earlier publications by Du Quesne a little later on. But there is one subject



raised in his new book that I want to mention now, because it has to do with some evidence that hints at a possible existence of the Great Sphinx in the Third Dynasty, considerably earlier than the time of Cheops and Chephren. There is no doubting Chephren's passionate enthusiasm for the Sphinx, and we will be seeing evidence for that later. But it is at least a possibility that Chephren usurped the Sphinx and the Valley Temple, thereby leading us to believe falsely that he was concerned in their actual construction and creation. Usurpation of monuments was practiced by pharaohs throughout Egyptian history, and we must be alert to the possibility—and I call it only a possibility—that Chephren may have done this. Certainly, I do believe that Amenemhet II usurped the Sphinx, as we have already seen in the previous chapter. After all, there is hardly a more extreme form of usurpation than sticking your face onto something!



Figure 5.15. This is a photo from the right rear of the Sphinx, showing the sweeping tail made mostly of modern blocks. Above it, the superficiality of many of the inlaid modern pale stone patches is clearly visible. The large, dark and weathered blocks may be from the New Kingdom, Sate, or Ptolemaic period. In the upper left of the photo, a strange square area has been patched with small blocks at some time in the past and suggests that a chunk fell out of the Sphinx here at one time. It is behind that area that the internal tunnel extends, so its southern wall must have collapsed and fallen out, possibly during Roman times, and was replaced with the area of small blocks. Just above this square patched area, and extending along most of the rump as visible in this picture, are the oldest repair blocks of all, thought to date from the Old Kingdom. The best patches of the Sphinx were the oldest, and as time went on, the quality of the patches became worse and worse, culminating in the modern ones, which are purely cosmetic, for although the tiny modern stones have been cut with loving care and placed with great precision, the elements are too small to be robust, and they cannot possibly have a long life, but will begin dropping out and falling off within decades at the most. (Photo by Robert Temple)

Du Quesne points out that a boundary stela has been excavated at the site of the Step Pyramid of Zoser, who was the first pharaoh of the Third Dynasty, and that it mentions "Anubis, Foremost of the Secluded Land."<sup>10</sup> The Secluded Land was a name for the necropolis, and in particular that of Giza. Later we will examine the use of this title in connection with Anubis at Giza. I mention this here because of the Third Dynasty evidence, the significance of which will become clearer in the later discussion. Du Quesne has also found at Saqqara in the Third Dynasty an inscription at a priest's tomb that refers to Anubis in the manner that was later to become familiar at Giza: "Foremost of the Secluded Land." The priest's name was Kha-Bau-Sokar, and the inscription describes him as the "Craftsman of Anubis, Foremost of the Secluded Land."<sup>11</sup> There are thus two firm references, as inscriptions on stone, in the Third Dynasty to Anubis in a form that suggests (according to the discussion that is to follow) Anubis as the Great Sphinx at Giza. These references in themselves do not prove anything, they are merely suggestive. However

seriously I may take them, everyone is free to dismiss them by saying that the term “Foremost of the Secluded Land” is just a name and means nothing. It will become clear as we go on why I think otherwise.

As for the Inventory Stela that I mentioned a moment ago, we will return to it in the next chapter for information about the locality of the Sphinx, information that derives from a document that cannot be earlier than the Fifth or Sixth Dynasty, because it mentions the god Osiris so prominently. Osiris did not come to real prominence before that time. (Prior to that, his name was not Osiris, which is the Greek form of the name Asar in Egyptian, but Khenti-Amentiu, which means “Foremost of the Westerners,” a name also used either for Anubis or for another form of jackal divinity. One might say, therefore, that Osiris was originally a dog!)

But for now, there are some extremely pertinent details about the Sphinx revealed in the Inventory Stela that have never received their due attention. This Inventory Stela was excavated at Giza by Auguste Mariette in the nineteenth century and is now in the Egyptian Museum at Cairo. In referring to the Sphinx, the stela nowhere describes it as having the body of a lion. Its body is not described at all, but by the time this description was written, the Sphinx had a head with a *nemes* headdress. Here is a crucial detail describing what the pharaoh did to it: “He restored the statue. . . . He made to quarry the hind part of the *nemes*, which was lacking, gilded stone, and which had a length of 7 ells [3.70 meters].”<sup>12</sup>

This bit of information is of great importance for the question of the present head of the Sphinx having been recarved from the neck of a larger head of Anubis. It suggests either that the neck was not thick enough for the full extent of the pharaoh’s headdress to be carved at the back, and that it had to be added separately by a pharaoh when “restoring the statue,” or that the job of recarving the neck of Anubis had been left incomplete, and he remedied this. If the present head were the original one, and had been cut from the original solid rock at the same time as the body, the full headdress would have been carved at that time, and would not have had to be added later. It is impossible now to examine these features because in the 1930s, Selim Hassan “restored” the headdress, added the lower portions of the cloth folds, or lappets, in modern concrete, and smeared modern cement around the neck and the rear of the headdress to strengthen and “improve” the structure. But if the rear of the headdress had to be added on in antiquity because it was lacking, it must have been lacking for a reason, and that reason cannot have been an oversight of the original carvers of the Sphinx. They had plenty of stone to work with, and carving the full rear of the headdress would have posed no problem to them. That the pharaoh’s head lacked that element indicates clearly that either the back of the original statue’s neck had been reached, and there was simply no stone left to carry the headdress any further, or the recarving was left incomplete because it would not normally be seen, so restricted was the access then to the side of the Sphinx. This textual evidence is fairly conclusive, no matter how late it is, or which pharaoh is really being referred to (we may disregard the text’s description of him as Cheops). For no matter how late the text is, it is still an ancient Egyptian text, and it still preserves this structural detail. Questions of the date of the text only affect the question of the *date* of the recarving, not the question of the *fact* of the recarving. Furthermore, we can dismiss the possibility of the information being merely fabricated in antiquity, since it is such a bizarre detail for anyone to think of, with no purpose to it, that a motive for inventing it is wholly lacking.

Selim Hassan supports Gaston Maspero in his belief that the Inventory Stela was actually carved by Pharaoh Psusennes I (also known as Pasebakhaenniut I and Pasebehkanu I), of the “Tanite” Twenty-first Dynasty, who reigned 1039–991 BC according to one chronology or 1063–1037 BC according to another. They also both believe that the stela preserves older textual material, though not necessarily of the Old Kingdom date as the stela pretends.<sup>13</sup>

One curious detail relating to the rear of the Sphinx’s *nemes* headdress is that a piece of it was found



in 1978 by Zahi Hawass. It had fallen into a hole behind the head drilled in the nineteenth century by Howard Vyse. As Mark Lehner comments in a caption in his book *The Complete Pyramids*: “When the cavity created in the back of the Sphinx [behind the head, which as a modern hole I have not bothered to discuss] by Vyse’s gunpowder was cleared in 1978 under the direction of Zahi Hawass, it was found to contain not only Vyse’s drill hole but also a large chunk of the Sphinx’s headdress with its relief-carved pleating.”<sup>14</sup>

It is probable that this loose chunk of headdress fell off the Sphinx’s head with the force of the blast of the gunpowder that Howard Vyse so foolishly used on the monument, and that it was part of the additional piece added to the head by a pharaoh (whose identity we may consider uncertain, though it is likely that it was Pharaoh Thutmose IV, of the Dream Stela that was described in chapter 3) as described in the Inventory Stela. It probably constitutes a confirmation of the information preserved in the Inventory Stela, though no one ever seems to have pointed this out before. This in turn encourages us to think that some of the information in the Inventory Stela is more ancient and valuable than it may superficially appear, though it certainly seems to be badly garbled.

With the Sphinx’s body, we really have only the choice between a dog and a lion. The body has to represent one or the other, since there is no other beast that can reasonably be suggested. And if anyone were to choose between the two purely on the basis of using his or her own eyes, the choice would have to be for a dog, since the Sphinx looks like a dog and does not look like a lion. Of course, if a person is determined to be conventional, and hates more than anything in life to depart from an accepted notion, that person will never choose a dog. It is really in the end a psychological matter rather than an observational one. On purely observational grounds, anyone would have to agree that the Sphinx has no leonine characteristics but does have canine characteristics and therefore must be a dog.

One of the greatest myths of humanity is that everyone cares about the truth. Many people do not. The idea that everyone does is merely a lie told to children. There are many people who do not give a damn about the truth, because they are too busy thinking about themselves for any exterior factor, particularly an inconvenient truth, to matter. The first question that comes up when faced with an inconvenience is self-interest: Is it to my advantage to admit that the Sphinx is not a lion, or would it make life more uncomfortable for me? The protective mutual construct that people build around themselves and share is something called *consensus reality*. They carry this around with them in the way that astronauts carry oxygen cylinders on their backs when they repair spacecraft in orbit. A person caught without his backpack is in real trouble: if a consensus reality view of something is not ready to hand, he or she may panic. This often happens at concerts and art exhibitions: What reaction is appropriate to something new? Applause? Jeering? Is it good? Is it bad? Quick, a critic must tell us! The art of political spinning is the art of constructing a consensus reality around political events so that their interpretation is manipulated within a context created by the spinner. It takes advantage of the fact that humans cannot interpret events on their own but require a context; the spinner supplies the context. This excessive timidity of humanity is what enables our species to be routinely manipulated. And as for seeing things, we see only what we are told we can see. The phenomenon of consensus blindness was discussed at length in my earlier book, *The Crystal Sun* which is basically a huge case history of the phenomenon over the ages.<sup>15</sup> This phenomenon means that people do not see what is in front of them because they believe they should not. They “censor” their optical impressions and rarely trust the evidence of their own eyes. The case of the Sphinx is a classic one of this phenomenon, which can almost be called a defining characteristic of the human race: millions of people have seen the Sphinx since it was cleared of sand, and not one until now has dared to say that it is not what it is said to be, and that it is *not a lion*. But this is just another example of the many

cases I give in *The Crystal Sun* of objects on display in museums that have also been seen by millions of people, including countless “experts,” but have not really been “seen” at all because they went against a consensus reality and were thus erased from consciousness. Humanity lives not in reality but in a vast collective dream. That is why heretics and original thinkers are always so persecuted, because they threaten the dream. The Sphinx for 3,400 years has been not a reality but rather a collective hallucination.

Anubis was the standard guardian of necropolises, of graves, of the dead. So it makes sense that a gigantic statue of him would have been erected at the entrance to the Giza Plateau. The Sphinx and the two adjoining temples, the Valley Temple and the Sphinx Temple, were at the very point of entry to Giza in ancient times. A quay has been excavated in front of the Valley Temple since the 1930s, which can be walked on by all tourists, and we know that at the time of the annual inundation, the water of the River Nile rose right up to that point and lapped at the entrance to the temples. One could approach by boat, alight, and enter the Land of the Dead. Of course, there has been no annual inundation since the Aswan Dam was constructed. And the course of the Nile has moved very far eastward, away from Giza, since antiquity. But old Victorian photos show the waters of the Nile nearly reaching the Sphinx circa 1900 (see figures in chapter 6), and the many early travelers’ reports that I have collected and translated make clear how close one could come to the pyramids by boat in recent centuries. As I mentioned in the previous chapter, it is acknowledged that the Nile inundation rose 26 feet higher in the Middle Kingdom than it did in the nineteenth and early twentieth centuries. And as Richard Pococke recorded after his visit to Giza in the seventeenth century, the Nile at inundation then came to within “half a quarter of a mile [i.e., an eighth of a mile]” of the Sphinx, a distance of only 660 feet, or 201 meters.

This was therefore the appropriate place for Anubis to rest, guarding the entrance to the necropolis. One landed at his feet in a boat and then walked up past the Sphinx on the Chephren Causeway, or by some other route nearby one ascended the slope of the Giza Plateau from this low point. It makes no sense for a gigantic lion to sit there awaiting visitors, because it was Anubis, not a lion, who was the appropriate guardian of the dead. Lions never guarded necropolises in Egypt.

There is fascinating evidence from the Archaic Period in Egypt (the period of the First and Second Dynasties) that huge effigies of Anubis were constructed of perishable materials at least as far back as 2800 BC. This information was collected by the historian of Egyptian architecture Alexander Badawy and published in an article in a journal that Egyptologists normally do not see, *The Journal of the Society of Architectural Historians*.<sup>16</sup> The only reason I was able to discover this important article was that I have been assiduously collecting everything published by Badawy for some years now due to my high opinion of him, and I have purchased portions of the libraries of several distinguished Egyptologists (Henry Fischer, Kent Weeks, etc.). Badawy gave an offprint of this article to one of them and typed the source on top (because this journal did not print it), and it was among a large pile of rare offprints that I have bought from these libraries by people such as Badawy, Hornung, and Lauer, whose work is of particular interest to me. I suspect that only a small circle of Badawy’s personal friends and colleagues ever knew that he had published this article in this obscure journal. Fortunately, it came to my hands, as I would never have looked in that journal, of whose existence I was unaware. I reproduce in figures 5.16 and 5.17 the drawings made by Badawy and reproduced in the article. As all who have studied Egyptian funerary architecture know, there was a tendency to represent in stone such items as walls and other structures that were normally constructed either in mud brick or in more perishable materials such as wood, wickerwork, and reeds. This is particularly evident at the funerary complex of King Zoser (Djoser/Djeser) at Saqqara, the center of which is the famous Step Pyramid. Stone was conceived of in religious terms as a kind of “freezing for eternity” of things that would otherwise perish. In the article just



mentioned, Badawy discusses this practice as it applied to sacred shrines in both Egypt and India.

He discusses and illustrates the brushwood huts of a hill tribe of India called the Todas, who live in the Nilgiri hills of southern India. He points out that these huts have been reproduced in stone as Buddhist and Hindu chaityahalls (places of worship) commencing in the third and second centuries BC. It is a freak coincidence that the Toda tribe, a throwback to remote antiquity in many ways, still builds these huts of brushwood and lives in them today. By what to me is an even stranger coincidence, I myself noticed this independently as long ago as 1963, as a teenager. I entered university very young, and from the age of eighteen, all my courses were at the postgraduate level. The language I was studying then was Sanskrit, and I naturally pursued Indian studies along with that.

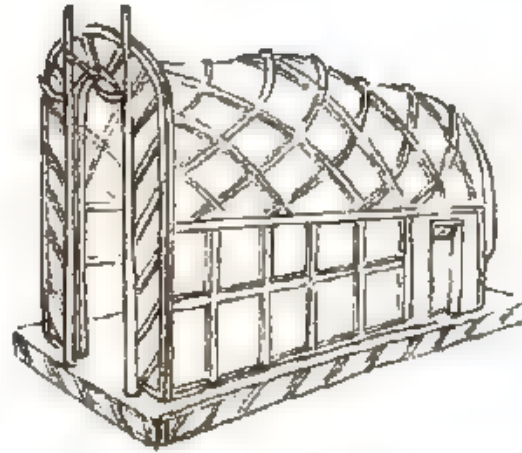


Figure 5.16. This is Alexander Badawy's perspective drawing of the Anubis hut, based on a flat view from the side of it carved in a First Dynasty depiction

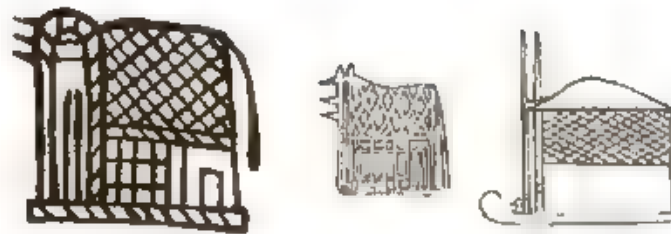


Figure 5.17. Depictions of Anubis huts from ivory labels found in First Dynasty royal tombs

In connection with my Indian studies, I developed a particular interest in the Toda tribe. I wrote two dissertations about the Todas of modest length when I was eighteen and nineteen, in one of which I pointed out that their huts had been reproduced in stone in just the way Badawy describes. I was entirely unaware of the existence of Badawy at that time or that he had noticed this himself four years earlier. We both noticed this strange thing entirely independently. No wonder I collect papers by Badawy, as our minds obviously work in the same way. But I have only discovered our mutual observation about the Toda huts now in connection with Anubis in Egypt, which is such an unlikely way to come across it. What a strange world of crisscrossing mental threads we live in!

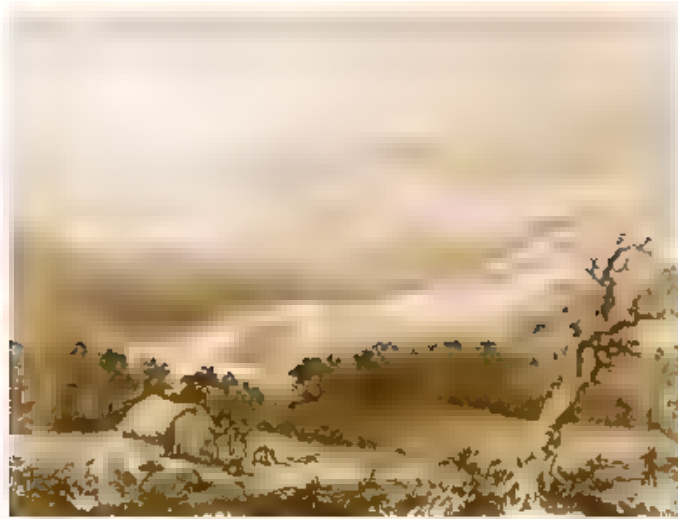


Figure 5.18. This is the earliest published depiction of a typical Toda hut, from the Nilgiri hills in South India. It was published in Captain Henry Harkness, *A Description of a Singular Aboriginal Race Inhabiting the Summit of the Neigherry Hills, or Blue Mountains of Coimbatore, in the Southern Peninsula of India*, London, 1832, opposite page 5. The hut is in the foreground at left. It is not unlike the Anubis huts seen in figures 5.16 and 5.17 (Collection of Robert Temple)

Badawy wrote the following about the Anubis shrines in ancient Egypt:

It needs no emphasis that symbolism played a predominant role in the religious and funerary architecture of all peoples in antiquity, and still does today. However, symbolic elements of architecture belong to an advanced stage in the development of representation. A much more primary stage is the one where the actual deity is represented architecturally as a structure formed according to his shape. This shape could be conceptual to suggest cosmic elements, for instance, the world itself as in the stupa of India, and the stretch of the horizon where the sun rises between two mountains as in the pylon of Egypt. It could also be simply realistic when it imitates the shape of an animal by which a deity is represented. Such a zoomorphic architecture may be exemplified in the so-called shrine of Anubis in Egypt.

Drawings from the Archaic Period in Egypt (2800 B.C.) represent an edicule ["little house"], probably religious or funerary, characterized by an irregular upper outline (figure 5.17). Structurally it can be described as having an irregular vault with a high arched doorway on the façade and springing from a lower vertical wall set on a shallow platform (figure 5.16). The plan is rectangular, and the possibility of its having an apsidal end is not to be excluded. The style of the representations and their date suggest that light materials such as reeds were used for the frame, and wickerwork for the walls. The structure unmistakably resembles that of a crouching animal, even to the pendent tail. I have presumed, on the grounds of a comparative study with early religious texts, that it could represent Anubis, the god of the dead, in the shape of a jackal crouching on a base. . . . The type does not seem ever to have been translated into stone architecture. The ideological concept is that of the embodiment of a god into his zoomorphic shrine, much the same as that of the cult object of Min into his edicule.<sup>17</sup>

The same subject was referred to in passing, though in not such a way as to draw one's attention, in Badawy's classic work, *A History of Egyptian Architecture*. In volume 1 of that work, Badawy reproduces one of the Archaic drawings and says: "A series of 1st dynasty seals represent a peculiar hut, shown in front elevation with side-elevation rabated. Certain examples (from the tomb of 'Aha') convey clearly the resemblance of a crouching animal, which could be identified with the desert-hound of Anubis."<sup>18</sup>

In other words, we have evidence in the form of pictures on seal carvings dating from the reign of King Āha, the second king of the First Dynasty, that in his day huge images of a crouching Anubis were constructed of perishable materials. Badawy ruefully observes, “The type does not seem ever to have been translated into stone architecture,” and clearly expected that it should have been. What could be clearer? The Great Sphinx of Giza was that “translation into stone” of the huge Anubis shrines of the First Dynasty. The Sphinx as Anubis thus has an impeccable pedigree, going back to the very origins of high civilization in Egypt, as proved by images surviving from that time.

There is also evidence from excavations near the Sphinx to substantiate the view that the Sphinx was Anubis. In his excavations in the 1930s, Selim Hassan found a Fifth Dynasty inscription near the Sphinx that mentions Anubis, which would still have been intact at that time, but not any of the names that in later ages became fashionable for the statue, such as Hu and Horakhty. In the second line of the hieroglyphs is the figure of the recumbent Anubis. The inscription was left by a priest named Hotep, and it mentions both Anubis and the hybrid god Ptah-Sokar-Osiris, who originally was simply Sokar, the underground god of Rostau beside the Sphinx. Anubis is mentioned twice, first by his own name and then by one of his titles (Imyut), which is the name of his symbol: “A boon which the King gives, and Anubis, who is upon his Mountain [Hill], Imyut, Lord of the Land [the “Land” is the necropolis].”<sup>19</sup> The king referred to is the king whom Hotep served during his lifetime, King Neferirkare (also called Kakai) of the Fifth Dynasty (who reigned 2473–2463 BC according to one chronology or 2483–2463 BC according to another). Hassan notes: “Now, the name of this King appearing in this place, coupled with the fact that the Tomb of Ra-wer, the most famous and favourite official of King Nefer-ir-ka-Ra, is situated only a stone’s throw away, seems to suggest some connection between that King and the Sphinx, or its locality. Perhaps he also carried out some work around the Sphinx.”<sup>20</sup> But the main point for us about the inscription at this early date is that Anubis is mentioned twice in a manner that implies his obvious connection with the place, whereas none of the references typical of later New Kingdom times when the body of the Sphinx was thought to be a lion is to be found.

If we search the ancient Egyptian literature for references, we find countless ones about Anubis as guardian of the dead. The Pyramid Texts of the Old Kingdom and the Coffin Texts of the Middle Kingdom are full of references to him. Some of these are associated with descriptions of the edifices and features of that region of Giza known as either Busiris or Rostau. Busiris (in Egyptian, Djedu) was a name attached to two separate places in ancient Egypt, a town in the Delta and, as Pliny makes explicitly clear, the settlement immediately adjacent to the Sphinx Precinct that has now become the modern village of Nazlet el-Samman. Rostau is the name of the immediate precinct at Giza that was particularly sacred to the underworld god Sokar (who later became absorbed into a joint god called Sokar-Ptah-Osiris). As I explain later, in chapter 7, Rostau (which has many variant spellings, such as Rosetau, Rosetawe, etc.) appears to refer to the immediate vicinity of the Sphinx and the Valley and Sphinx Temples. The Dream Stela, the Inventory Stela, an inscription of the Saite king Psamtik II, and other sources all make clear that Rostau includes or is immediately adjacent to the Sphinx enclosure.

Hence it is of no small importance to our thesis of Anubis as the Sphinx to realize that a frequent title of Anubis was Lord of Rostau. If the Sphinx was Anubis, and was at Rostau, then to substantiate our case we need to find some ancient references to an Anubis at Rostau. And that is exactly what we find aplenty. The Egyptological scholar Terence Du Quesne has gathered many references to Anubis as Lord of Rostau in ancient inscriptions and wall carvings; he lists no less than ten published sources for these, which include many examples of the title.<sup>21</sup> Certainly, a giant statue of Anubis crouching at Rostau is precisely what one would be tempted to call “Lord of Rostau.” After the Fifth Dynasty, the title Lord of Rostau



began to be applied to Osiris, whereas previously the only joint claimant to the title was the underworld god Sokar, who actually resided beneath the earth at that point. Sokar and Osiris became merged into one another as Sokar-Osiris after the Fifth Dynasty. And as if that weren't enough, the neighboring god Ptah of Memphis was brought into the mix as well, so the Egyptians ended up with a trinity called Sokar-Ptah-Osiris, who then became the new Lord of Rostau. But certainly in the beginning it was only Sokar and Anubis who were Lords of Rostau: Sokar because he lived underground at that spot and Anubis because he crouched on the surface as the site's guardian. And we have plentiful textual evidence as well as inscriptions.

In the Coffin Text Spell 241, Anubis is mentioned in the same breath as Rostau; the deceased, who identifies himself with Osiris, is speaking: "I am Osiris and I have come to Rosetau in order to know the secret of the Dat [Duat; netherworld], to which Anubis has been initiated."<sup>22</sup>

Particular attention has also been drawn to this passage by Terence Du Quesne, who has written several further studies of Anubis and the jackal. His 1991 book *Jackal at the Shaman's Gate* bears the subtitle "A Study of Anubis, Lord of Ro-Setawe" (Rostau).<sup>23</sup> In this book he speaks of "the gate, called by the Egyptians Ro-Setawe" and quotes a Middle Kingdom text referring to it and specifying that Anubis is to be found there:

In the *Book of the One in the Netherworld*, there exists a strange corridor, the "land of Sokar," between the chambers of the third and fourth hours of the night, through which the justified soul must travel in order to reach the dawn. Its explanatory text is unequivocal:

*The secret ways of Ro-Setawe  
The gate of the gods  
Only one whose voice is heard  
May pass them . . .  
The secret way to which (only) Anubis has access  
In order to conceal the body of Osiris.*

Anubis, god of embalmment and reviver of the original Osiris, conceals the body of the justified person, who is identified with Osiris, in order to breathe life back into it. Here is the bridge between death and rebirth. Two passages in the *Coffin Texts* are similarly explicit:

*I have come . . . to enter the secret gateway  
By which Anubis is initiated.  
I have come to Ro-Setawe  
In order to know the Mysteries of the Netherworld  
Into which Anubis is initiated.*

It should be understood that the divine king identifies himself with Anubis as all justified souls [*those good people who are worthy to live eternally, and escape annihilation*] do with Osiris later in Egyptian history . . . Anubis is often given the title Lord of Ro-Setawe [Rostau]. One spell in the *Coffin Texts* is entitled "Invocation for Entering the Gate of the Netherworld" and has the justified person declaring: "I have come in order to enter the gateway that is protected by Anubis." . . . One of Anubis's most appropriate attributions is "Master of Secrets" . . . and the pharaoh Cheops in later times himself received the epithet of "Master of Secrets in Ro-Setawe." . . . The local deity of

Memphis is Sokar, whose name survives in “Saqqara.” From early times Sokar is “lord of Ro-Setawe,” an epithet also given to Anubis. . . In many representations, the Anubis jackal is shown couchant on a funerary chest or box known as the “sacred casket.” . . . This is in his capacity as “Master of Secrets.” This container may be seen as a kind of Pandora’s box which is the symbolic entrance-way to Ro-Setawe.<sup>24</sup>

We can see that there are many passages in ancient Egyptian texts that locate Anubis at Rostau (which Du Quesne prefers to spell Ro-Setawe, both variant spellings being technically correct), which is at Giza and is believed to be that part of Giza where the Sphinx is found. The problem noted earlier that there are “no references” to the Sphinx in the ancient Egyptian literature is immediately remedied if we assume that the Sphinx was a giant statue of Anubis, for then we are positively deluged with references in ancient Egyptian literature. And one of the passages just quoted actually describes the gate at Rostau as being *protected by Anubis*.

Anubis is often described in the texts as “presiding over the Pure Land,” which means the necropolis, and which is one of the names of the Giza Plateau. The Gate of Geb (the Earth god), or the Doors of Geb, was located at Rostau, at the feet of Giza. In the Pyramid Text Utterance 437, we read of Anubis “on his baldachin” at the Doors of Geb “Baldachin” is the translation often given by Egyptologists to the Egyptian word for the strange shrine on top of which Anubis is usually portrayed stretched out on his belly. Anubis is seen crouching on top of it in figure 5 9. This is what Du Quesne perhaps more sensibly calls a funerary chest. Since *baldachin* is not a word any of us uses in daily conversation, I thought I ought to quote its definition as given in the *Shorter Oxford English Dictionary*. “A structure in the form of a canopy, either borne on columns, suspended from the roof, or projecting from the wall, placed above an altar, throne, or doorway.”<sup>25</sup>

From this we may see that “baldachin” is not entirely satisfactory as a translation for a solid structure, but as the Egyptologists insist on using it, we need to know its meaning if we are to understand their translations as they relate to Anubis.

In the Pyramid Texts Utterance 437, we read of the risen soul: “You arise as Anubis who is on the baldachin.”<sup>26</sup>

This appears to refer to the resurrected deceased still recumbent on his death-couch, as we see so often in the depictions of Osiris. The recumbent Anubis is therefore to be taken as symbolic of the prostrate but yet living dead. In fact, the god of Rostau, Sokar, is often depicted lying on a bier, perhaps in imitation of the recumbent Anubis. I reproduce an ancient depiction of this eerie scene in figure 8 38, where Sokar is replaced by his successor, Osiris.

Anubis is further described in the same text as “Anubis who presides over the Pure Land,” in other words, the necropolis. In Pyramid Text Utterance 581, instead of “the Pure Land,” it is “the Sacred Land” over which Anubis presides.<sup>27</sup> These are alternative ways of describing the necropolis. Another form that we have already encountered is “the Secluded Land.” These “Lands” are all the same. And one inevitably wonders, if Anubis is “presiding” over the necropolis, how is he doing so? In other words, is he present? Is he represented? To crouch as guardian at the entrance to the necropolis is indeed to “preside” over it.

A description is also given in Utterance 437 of the dramatic events that the risen soul encounters at Rostau, where the gates or Doors of Geb are to be found: “The earth speaks: The doors of the earth-god are opened for you, the doors of Geb are thrown open for you, you come forth at the voice of Anubis, he makes a spirit of you.”<sup>28</sup>

If perhaps the gigantic statue of Anubis, now known as the Sphinx, is what is referred to here, perhaps he did “speak” and deliver pronouncements when he was Anubis, just as verbal tradition maintained in much later centuries that the Sphinx, by then with a pharaoh’s head, often did. For the tradition is persistent that the Sphinx “spoke,” and a speaking tube, tunnel, or simply a projected voice might well have been employed by the priests in the earliest times. Thus there may well have been a physical “voice of Anubis” at ceremonies.

The ancient descriptions of a *couchant* Anubis are so incredibly precise, in fact, that Pyramid Text Utterance 659 describes a recumbent Anubis as being *beside a causeway*. And as we know, the Sphinx is indeed beside what we now call the Causeway of Chephren: “You have descended as a jackal of Upper Egypt [a description of the type of jackal, not of its location in this text, which suggests that these wild dogs came from there], as Anubis on his baldachin. May you stand up at the causeway [as Geb] who presides.”<sup>29</sup>

Pyramid Text 677 has an intriguing description of the recumbent Anubis: “O King, your shape is hidden like that of Anubis on his belly; receive your jackal-face and raise yourself, stand up.”<sup>30</sup>

“Receive your jackal-face” refers to the common practice of the donning of a jackal mask (see figure 5.19). Many of the jackal-headed figures seen in Egyptian wall carvings are of priests with jackal masks and are not intended to represent Anubis himself. A very clear depiction of a priest wearing a jackal mask is known from the Temple of Denderah, where in an instance of “transparency of depiction,” the priest is shown with his own face and superimposed over his face is the head of Anubis (with his eye holes being in Anubis’s neck). A clay mask of Anubis with eye holes in the neck is actually preserved in the Hildesheim Museum in Germany and was tried on by Arelene Wolinski, who said “it fitted comfortably over her head and rested on her shoulders and back. The two holes in the jackal’s neck turned out to be just at the right spot for eye holes, thus confirming the accuracy of the Denderah relief.”<sup>31</sup> An older animal mask dating from the Middle Kingdom also survives, “in the form of a grotesque lion’s head, and was found at Kahun . . . This object shows signs of wear, indicating that it was in frequent use” This was discussed by Terence Du Quesne in his lengthy article about ritual Egyptian masks published in 2001, which culminates with his description of getting a modern puppet maker to fabricate an Anubis mask, of which he says that “the process of creating the mask took the equivalent of about five weeks of full-time work.” Du Quesne says the mask weighed about 1.1 kg and “adds about 45 cm to one’s height,” and the effort was very successful at replicating a usable Anubis mask as depicted in ancient Egyptian art.<sup>32</sup>

The strange feature of the Pyramid Text’s description of the recumbent Anubis that has just been quoted is the comment that his shape is “hidden.” What can this mean? I believe this is a specific reference to the Sphinx, but to make clear how it applies to the Sphinx, I need to move on to the next idea about what the Sphinx was originally like, which is in the next chapter. There we shall see that part of the body of Anubis may well have been obscured and “hidden” during the Old Kingdom, in a way that once again accords with much textual evidence.





Figure 5.19. Anubis not only guarded the dead, he was also the god of embalming. Here he is seen ministering to the king's mummy. Beneath the lion-footed table on which the royal mummy rests are the four jars containing the viscera of the deceased pharaoh. These are discussed in chapter 6, where their part in a ceremony beside Jackal Lake is discussed. This illustration appeared in Villiers Stuart, *Nile Gleanings*, John Murray, London, 1879, plate 23, opposite page 194.

The book by Du Quesne, *The Jackal Divinities of Egypt*, presents a large amount of crucial information about Anubis at Giza, and what is revealed by this is most remarkable and highly relevant to our subject. There was certainly something of an obsession with extra-large Anubis figures at Giza during the Fourth Dynasty, which is the dynasty of Cheops and Chephren.

Du Quesne calls attention to a considerable number of hieroglyphic inscriptions from Giza during the Fourth Dynasty that contain giant pictures of Anubis. These large Anubis pictures completely dwarf the surrounding hieroglyphics, while acting as a hieroglyphic sign simultaneously with being illustrative. As far as I know, this phenomenon has not otherwise occurred in Egyptian hieroglyphic inscriptions either before or since that time. It is therefore highly important, and so far has had no explanation other than whimsy. Here are the comments Du Quesne makes about the four Giza tomb inscriptions, which he designates IIIA7, IIIA8, IIIA9, and IIIA10: “showing couchant jackal . . . depicted very large,” “with disproportionately large representations of couchant jackal,” “large isolated figure of couchant jackal, facing right,” and “disproportionately large representations of couchant jackal.”<sup>33</sup> These Anubis figures really do dwarf everything else. I reproduce examples in figures 5.20 to 5.23. Du Quesne says of these huge jackals in the midst of normal inscriptions:

L. Holden associates [a jackal statue found at Giza] with a small genre of tomb reliefs of the period which show, in the offering formula, greatly enlarged jackal figures. . . . The earliest . . . has the jackal many times larger than the accompanying signs. . . . In a few cases, similarly enlarged jackals are encountered on sarcophagus lids of the period . . . These early Anubis representations in the formula of offerings have some intriguing features. They seem to originate in Giza, in the family of the great pyramid-building kings of Dynasty IV . . . the eldest son of Cheops, . . . his son and vizier . . . his daughter . . . [and] Chephren's queen. We may assume that the size of the Anubis figures was designed to emphasize the importance of the god in protecting the tombs' royal occupants in the netherworld. Such images might also have reinforced the kings' funerary cult.<sup>34</sup>

So we have “supersized” images of Anubis in these royal tomb inscriptions dwarfing everything that is near it or around it. It is wholly out of character for Egyptian art for there to be such outlandish

“supersized” Anubises. The Egyptians were fanatical about keeping everything in correct proportion. So why were these images of Anubis enlarged to such gigantic size in a way that no other god in the entire history of Egypt ever was? Reinforcing a funerary cult is not a good enough explanation. Neither is protecting the royals in the netherworld. That would not explain the giant Anubises. The Egyptians just didn’t do things like that. Furthermore, we cannot even assume propaganda as a purpose, since these were tomb inscriptions, which few people would ever see. So what was the purpose? What if the giant Anubises were intended to represent a giant Anubis that actually existed? Wouldn’t that make sense? What if they were actual pictures of the largest Anubis in Egypt, the Great Sphinx of Giza?

Five of the most impressive of the supersized Anubises were found in three of the most prominent of the tombs (mastabas) of the Eastern Cemetery at Giza. Both of them are in the “front row” just east of the three little pyramids known as “queens’ pyramids” that stand immediately southeast of the Great Pyramid. Some people like to have “front-row seats” at the theater. But these are “front-row tombs,” sure to be of use when you are dead! (That way, do you get to see the gods better?) The first of the front-row tombs for us to consider is that of Prince Khafkhufu, a younger son of Cheops (Khufu). Khafkhufu was Controller of the Palace, Sole Companion to the King, and Priest of the Souls of Nekhen (the “souls of the south”). He was given one of the most important mastaba (aboveground) tombs at Giza. Here is how William Kelly Simpson describes it: “The mastaba of Khafkhufu I and his wife is one of the two great double mastabas in the row nearest the great pyramid in the eastern cemetery, situated south of the pyramid causeway and east of the three queens’ pyramids.”<sup>35</sup>

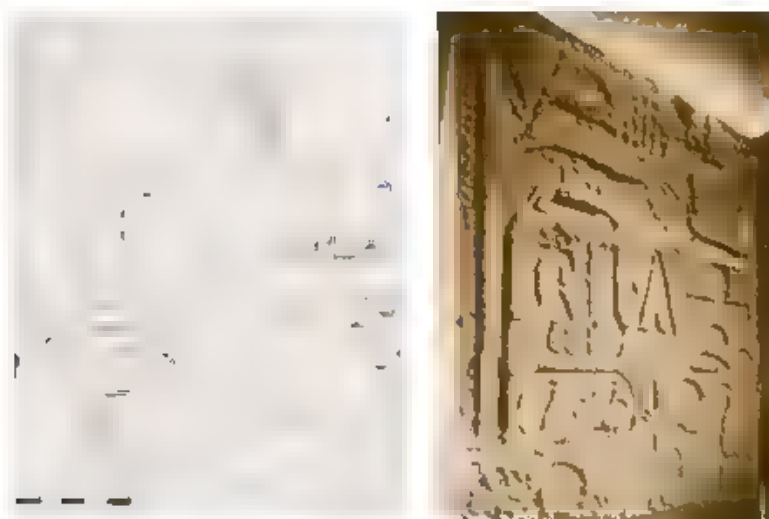


Figure 5.20. Drawing (left) of the inscription on the northern doorjamb (right) of the tomb chapel of Prince Khafkhufu I at Giza. (From Dunham Dows and William Kelly Simpson, *The Mastabas of Kawab, Khafkhufu I and II*, Boston, 1978)



Figure 5.21 Drawing (left) of the inscription on the southern doorjamb (right) of the tomb chapel of Prince Khafkhufu I at Giza. (From Dows and Simpson, Kawab and Khafkhufu)



Figure 5.22. Drawing (left) of the northern doorjamb (right) of the tomb chapel of Queen Mersyankh III at Giza. (From William Kelly Simpson, *The Mastaba of Queen Merysankh III*, Boston, 1974)



Figure 5.23. Drawing (left) of the southern doorjamb (right) of the tomb chapel of Queen Mersyankh III, wife of King Chephren, in her mastaba at Giza. (From Simpson, *Merysankh III*)

Supersized Anubises were carved on the two opposite entrance jambs of the southern chapel of this mastaba tomb. On top of them, at one time, had stood part of the Temple of Isis, which was built at a later epoch. These two Anubises are shown in figures 5.20 and 5.21. Beneath both is a king's name in an ellipsoidal cartouche: that king is Cheops (Khufu), the father of the prince and reputed builder of the Great Pyramid at whose foot this tomb stands. These huge Anubises function as a hieroglyph in each inscription, but at the same time stand out as the prime pictorial element. The inscription of the northern picture says: "A boon which Anubis, foremost of the necropolis, gives, (namely) a good old age before the great god (for) the king's son Khafkhufu." The southern inscription says: "A boon which Anubis, he who is in W[et], [this archaic place name, also spelled Ut, has among its meanings "hole," as well as being the second half of Imiut, a title of Anubis and the name of his fetish symbol, the whole of which name could be taken to have the meaning of "the inside of the hole," thus possibly being a reference to the Sphinx Pit: Anubis being "in Wet" thus potentially meaning Anubis being "in the Pit"] gives, (namely) power and nobility before the great god (for) the king's son Khafkhufu."<sup>36</sup>

These huge pictures of Anubis were thus incorporated into inscriptions that called upon Anubis to grant the soul of Khafkhufu power, nobility, and "a good old age" in the afterlife. Anubis was to grant these things to the prince through his position as Foremost of the Necropolis, that is, the chief deity of



Giza. The inference that Anubis as the Sphinx was the chief presiding deity referred to is hard to resist, as is the supposition that the pictures were meant to refer to his giant statue nearby.

The eldest brother of Khafkhufu also had at least one giant Anubis in his tomb, which can be seen in figure 5.24. He may have had more, but his tomb has been greatly destroyed. This was Prince Kawab, who should have become pharaoh after the death of Cheops, but as he died just before becoming king, his other brother Djedefre (also known as Rededef, or Radjedef, who, it has been suggested, may have murdered Kawab to secure the succession for himself ) became pharaoh instead (though he built no pyramid at Giza), and Djedefre was in turn succeeded by Chephren. Simpson describes Prince Kawab's mastaba tomb as follows: "Prince Kawab, the eldest son of Cheops, was buried in the large double mastaba on the east side of the pyramid of Cheops in the first row of mastabas nearest the pyramid, just south of the pyramid causeway and east of the northernmost of the three queens' pyramids. By its position it is singled out as the pre-eminent mastaba in the eastern cemetery."<sup>37</sup>



Figure 5.24. Plan and section of the tomb of Prince Kawab at Giza. In the bottom half, to the right of center at the top of the wall beside which the granite sarcophagus (not shown) of the prince would have rested, is one of the inscriptions with a supersized Anubis (From Dows and Simpson, Kawab and Khafkhufu)

Three surviving inscriptions showing the supersized Anubis were carved just above Prince Kawab's granite sarcophagus and read:

(1) A boon which the king gives and Anubis, foremost of the divine booth, a burial in the necropolis as a possessor of a well provided state before the great god, officiant of Anubis, priest of Selket, Kawab; (2) a boon which the king gives and Anubis, foremost of the divine booth, a burial in the necropolis in the western cemetery [this is an interesting detail, because it shows that what we call the Eastern Cemetery because it is east of the Great Pyramid was called by the Old Kingdom Egyptians the western cemetery because it was west of the Sphinx], having grown gracefully old, the king's son of his body, Kawab; (3) king's eldest son of his body, officiant of Anubis, Kawab.<sup>38</sup>

It is interesting to learn that the eldest son of Cheops and crown prince held as his chief position "Officiant [Chief Priest] of Anubis." One might well wonder what this could possibly mean, and how such duties could conceivably be carried out, since there was no temple of Anubis or even any known cult center of Anubis where one could officiate as a priest. All these problems dissolve when one realizes that Anubis was just a few minutes' walk down the hill, and was the Sphinx. In fact, the ceremonies at which the eldest son of the deceased pharaoh was required to preside after his father's death took place at the Sphinx, and are described in the next chapter, from texts found among the Pyramid Texts of the succeeding dynasty (I should mention in passing that it has been suggested that Kawab and Chephren were really the same person, and that the tomb of Kawab was built for Chephren before he became king, after which he

changed his name. However, this is only speculation, and is also very confusing to us.)

The other front-row mastaba to consider is that of Queen Mersyankh III, who was the granddaughter of Cheops, some say the widow of her uncle Prince Kawab, definitely the daughter of her aunt and sister-in-law, who was wife of King Djedefre (or Rededef/Radjedef ), niece and sister-in-law of King Djedefre, and queen of her brother-in-law and uncle, King Chephren. She was also Priestess of Thoth, to whom she was not related. (That's a joke, just in case you are too dazed by all these incestuous relationships to realize it.) The two supersized Anubises in this queen's tomb were carved as part of inscriptions in the northern and southern jambs of the entrance to the tomb chapel, which is the best-preserved tomb chapel in the entire Eastern Cemetery (or as she would have said, the western cemetery) They are shown in figures 5.20 to 5.23. On the north doorjamb, the inscription reads: "A boon [a gift] which the king gives and Anubis foremost of the divine booth to a spirit who is noble in the sight of the great god, lord of the desert. Beholder of Horus and Seth, King's daughter, greatly praised, King's wife, Mersyankh."

On the southern doorjamb, the inscription reads:

A boon which the king gives and Anubis, he who is in Wet, lord of the necropolis, to a spirit who is noble in the sight of the great god, lord of the necropolis. Beholder of Horus and Seth, great favourite, companion of Horus beloved of him, follower of Horus, King's wife, King's daughter, Mersyankh.<sup>39</sup>

We should note that Anubis is called twice not only the Lord of the Necropolis here but also Lord of the Desert, and once again is referred to as "the great god." The eternal gifts are given to the deceased in these inscriptions jointly by the pharaoh and by Anubis. The inference that the Sphinx as Anubis is being referred to becomes increasingly strong. As I have already mentioned, the supersized Anubis functions also as a hieroglyph in the inscriptions. Where it does so is in the actual appearance of the name Anubis in each of the inscriptions quoted in translation above. In other words, what the inscriptions really say is, to take one example: "A boon which the king gives and [supersized picture of Anubis] foremost . . ." and so forth. Anubis is not spelled out; it is shown by the giant picture. What all the inscriptions might therefore be saying is that the boons are given by the king and by the Sphinx, understood to be the supersized statue of Anubis presiding over the desert necropolis, or, as we might lightheartedly call him, Anubis Magnus.

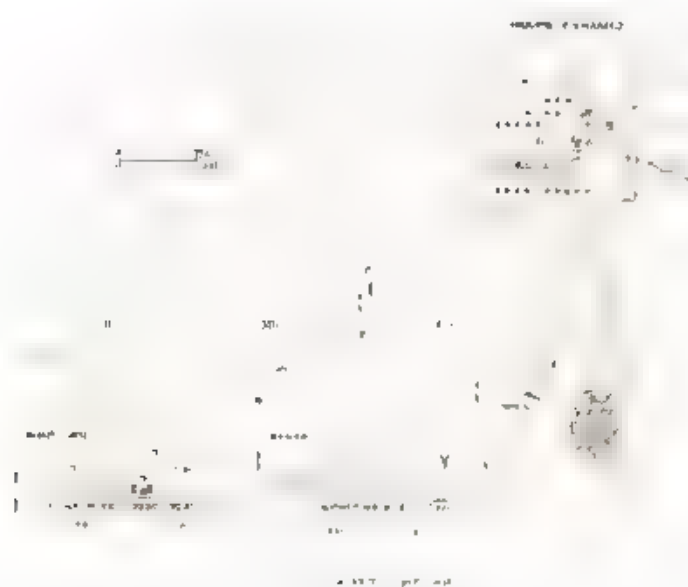


Figure 5.25. The mastabas of Prince Khafkhufu (left) and Prince Kawab (right) are shown here on this plan from William Kelly Simpson, at the bottom of the picture. Above them are the three mini-pyramids known as the queens' pyramids. At the top of the

picture is the southeast corner of the Great Pyramid of Cheops. The strange oblong shapes are boat pits, where wooden boats were once buried for use in sailing the celestial seas of the other world. At the foot of the Great Pyramid was the Funerary Temple of Cheops, now entirely gone except for part of its magnificent and beautiful basalt floor. Leading down from the site of the Funerary Temple we see the commencement of the now vanished Cheops Causeway, with a long boat pit beside it. It bends at an angle to the north, whereas the Chephren Causeway bends at an angle to the south. The strangest feature of the Cheops Causeway is that it went to the edge of the cliff and plunged off it and then continued below! Part of its further course may be seen in the old plan in figure 6.12, drawn before houses crept up to the edge of the Giza Plateau. We now know that this Cheops Causeway culminated in the Valley Temple of Cheops—on top of the ruins of which at the moment sits a private house. Since the man who lives there is a prominent resident of Nazlet el-Samman whom no one wishes to offend, nothing has been done about gently suggesting to him that he might go house hunting. It is hard to imagine what could be more important currently than excavating the Valley Temple of the man who is supposed to have built the Great Pyramid, but then *c'est la vie égyptienne*. (Figure 3 in William Kelly Simpson, *The Mastabas of Kawab and Khafkhufu I and II*, Boston 1978)

Anubis was especially honored by Fourth Dynasty pharaohs in another way as well. In the ruined Valley Temple of Mycerinus (the pharaoh whose name has been attached to the smallest of the three Giza pyramids), archaeologists found the remains of a green statue of Anubis, said to be made of “green basalt” (whatever that is!) or otherwise of green “diorite” (whatever that is!), though I suspect that, as usual, the Egyptologists, who generally know little about mineralogy, have given a wrong identification of the stone, or should I say two wrong identifications. It is probably a stone called by the Egyptians *bekhen* and is a graywacke, or mudstone, containing chlorite, which makes it look green. This statue was of an Anubis *couchant*, in other words, a miniature replica of what I believe to have been the original form of the Great Sphinx of Giza. This statue was a foot high and nearly 2 feet long. It is preserved in the Boston Museum of Fine Arts. Du Quesne says it “is probably the earliest extant example of a figure of the Anubis jackal in its canonical form. . . . Perhaps the earliest three-dimensional jackal figure extant.”<sup>40</sup> I would suggest that, in addition, it is possibly the only surviving three-dimensional replica of the original form of the Sphinx. It is not complete, but enough of it survives for us to be certain that it represents the standard form of the recumbent jackal lying on its belly with its paws stretched out in front of it.

There are many mentions of Anubis in inscriptions in tombs at Giza besides the royal ones of the Fourth Dynasty that were given above.<sup>41</sup> These tend to use more or less the same formulas, describing Anubis as Lord of the Necropolis who gives a boon to the deceased and so forth. However, there is no need to survey the whole of the tomb inscriptions of the Giza Plateau, as the point has been sufficiently made. See figure 5.26.

Another feature of Anubis that is continually mentioned throughout Egyptian history is that he is associated with a hill or mountain. This hill or mountain is never specified precisely, and one gets the impression that we are meant to be familiar with the reference without any need for explanation. Anubis is often called “Anubis on his hill” or “Anubis on his mountain.” Most Egyptologists use the translation “hill” instead of “mountain,” as it is not thought that an actual high mountain is intended, and there is no evidence of any kind to associate Anubis with a real mountain. Strangely enough, in the earliest texts, namely the Pyramid Texts, this epithet does not occur. Because so little has been written about Anubis, it seems that no one has searched the Pyramid Text references to Anubis before now to check this. It is rather odd that this description of “Anubis on his hill,” which is so common for thousands of years afterward, is absent from the earliest texts, which are nevertheless full of references to Anubis, generally describing him as being recumbent, presiding over the Pure Land or the Sacred Land, and being “on his baldachin.” It is as if at the time of the Fourth Dynasty, as well as in the Pyramid Texts (Fifth and Sixth Dynasties, circa 2500–2200 BC), there was no need to mention that Anubis was associated with a hill, but merely to stress his position as guardian of the necropolis. Later, it seemed important to associate Anubis with a hill. And I believe that this was because the center of gravity of the pharaoh’s court had moved away from Memphis, so that it was necessary to call to mind the fact—previously unavoidable and



known to all who mattered—that Anubis was to be found at the Giza Plateau, the plateau being, of course, a hill. For those who had moved away from Memphis, it was just as well for them to remember that Anubis guarded the entry to the most famous hill in Egypt. When everyone was living beside it, it was merely called the necropolis, that is, the Pure Land or the Sacred Land. But when people were no longer beside it, it was recalled to mind as *the hill*.



Figure 5.26. This fragment of a stone carving shows a portion of an inscription featuring a recumbent Anubis lying on his belly in the same position as the Sphinx. The inscription shows the hieroglyph *hotep* beneath Anubis (whose Egyptian name was Anpu) so that the reference is to the personal name Anpu-hotep, meaning Anubis is at Peace, which was used by high priests of the period between the First and Third Dynasties, a period prior to the conventional date of carving of the Great Sphinx. The fragment was excavated in the season 1922–1923 at the site of Abu Ruash, a hill that overlooks Giza, by French archaeologists. It was found at the entrance to the underground site, hypogeum H-9. It is plate XVIII, number 4, in M. F. Bisson de la Roque, *Rapport sur les fouilles d'Abou Roasch* (1922–1923), in *Fouilles de l'Institut Français d'Archéologie Orientale de Caire* (Années 1921–1923), Cairo 1924. See also the text discussion of the find on page 62 of that volume. (Collection of Robert Temple)

“Anubis on his hill” therefore became, I believe, the standard way of referring to the Great Sphinx of Giza. The phrase seems to have occurred for the first time in the Fifth and Sixth Dynasties, after the Pyramid Age and as the Old Kingdom was drawing to an end.<sup>42</sup> The Egyptian expression “he who is on his hill” is *tepidjuf*. Du Quesne suggests that this title “has no direct funerary associations, and is usually taken to refer to the natural desert habitat of the jackal, and to the rugged terrain of the necropolis.” I would say that this is near to the truth, for the “hill” is clearly the Giza Plateau, which is indeed rugged and a desert, and, above all, is a hill. I believe that “Anubis on his hill” is synonymous with “the Sphinx of Giza.” In fact, the word *dju* (hill) also means necropolis, as does *tep-dju*. And a *tepi-dju* is also a “necropolis official.” Therefore, the very same words that mean “he who is on his hill” also mean “necropolis official” or “necropolis head.” The epithet “he who is on his hill,” as applied to Anubis, therefore always had the double meaning of “he who is at the head of the necropolis,” that is, at Giza. It seems clear that only the Sphinx can be referred to.

In the Middle Kingdom (2119–1793 BC according to one chronology; circa 2000–circa 1750 BC according to another), the texts known as the Coffin Texts are found in coffins of the period. They were not intended to be read by anyone but the deceased and the gods, as they were inside the coffins in the form of protective spells. But they reveal much mythological and religious lore, and some of it is derived from the earlier Pyramid Texts. In Spell 825, a Spell for Entering the Netherworld, we are specifically told by the deceased that he has entered its “gate which is under the care of Anubis.”<sup>43</sup> Since the gate to the netherworld was at Rostau, the expression that the gate was “under the care of Anubis” is another interesting reference that appears to apply to the physical presence of Anubis as official guardian of

Rostau at Giza.

In Spell 629, Anubis is described as being in Djedu (i.e., Busiris, now Nazlet el-Samman), which is where Rostau is situated (Rostau being a more restricted portion or precinct of Djedu). He is also there called Lord of the Desert, which is unusually specific, in that his “Land” is generally called, by a religious euphemism, either the Pure Land or the Sacred Land, but here the scribe slips and specifies that it is in the desert, as Giza indeed is.<sup>44</sup> Djedu and Rostau are mentioned together in Spell 314, where the “secret thing” and the “mysteries” of the god Osiris (originally those of the god Sokar) are given the specific physical description of being in “the deep place in Rostau,” obviously a reference to a deep underground location there.<sup>45</sup> Although many ancient texts refer to underground caverns and chambers and tunnels at Rostau, it is rare to find a more physically specific description referring to “the deep place.” There can hardly be any doubt, from the many textual references, that Rostau contains vast underground constructions, many being expanded natural cavities in the limestone.

I shall have much more to say about this in the future, as the underground complex at Rostau, near the Sphinx, is a subject concerning which discussion has only just begun, and it goes far beyond the scope of this book, the limited purpose of which is to establish the truth about the Sphinx as a preliminary step to carrying forward the discussion of what else was really going on at Giza in the period before the Fifth Dynasty. Much of the further discussion is found in my next book, *Egyptian Dawn*. However, a partial indication of that subject is also found in the next chapter, which re-creates one of the most important ceremonial purposes of Giza in the early days, before the true tradition decayed and became merely a memory. It is necessary to establish this crucial ceremonial tradition clearly for the record, since until it is grasped, further discussion of Giza cannot proceed. After all, the Sphinx stands guard over the necropolis not only in a physical sense but in an intellectual sense as well: failure to comprehend its true purpose blocks all further progress by the inquirer, and the problem of the Sphinx thus acts as a guardian and an obstacle to understanding anything else stemming from that period. You have to grapple with the Sphinx first and solve its riddle, just as Oedipus did in Greek myth, before you can avoid being devoured and can go on to *enter the true city*.



## SPHINX ISLAND

During the 1990s, the general public in many parts of the world was subjected to a massive wave of publicity and marketing relating to the Sphinx. This was principally generated by the books and TV documentaries of three popular writers who agreed about one thing: the Sphinx was at least 12,500 years old because there was evidence of water erosion in the Sphinx Pit, and this must have been caused by “ancient rain” circa 10,000 BC, when Egypt was believed to have had a different climate than it has today. Although I agree that there is evidence of water erosion in the Sphinx Pit, I reject these ideas, believing this can be explained in a new way. Through constant and insistent repetition, like some sort of hypnotic mantra, by means of books, conferences, and television, the idea that the Sphinx is at least 12,500 years old seems to have hardened into a kind of dogma to such an extent that among “alternative” audiences, anyone who does not accept it can even be presumed to be part of an orthodox conspiracy to suppress the truth.

By a strange quirk of fate, I became directly involved in this odd story of the “ancient rain” theory of the Sphinx at a very early stage. The observation that there appeared to be water erosion on the Sphinx itself (no mention was made of the Sphinx Pit) was first made by the Egyptological scholar Schwaller de Lubicz in a book published in French in 1961, where it was mentioned only in passing as an enigmatic feature. The book was called *Le Roi de la théocratie pharaonique* (*The King of Pharaonic Theocracy*). An English translation was eventually published in 1982 under the title *Sacred Science: The King of Pharaonic Theocracy*.<sup>1</sup> In this book, Schwaller de Lubicz mentions, in the midst of a general discussion of the Sphinx, “that Sphinx whose leonine body, except for the head, shows indisputable signs of aquatic erosion.” He added a footnote that stated further: “It is maintained that this erosion was wrought by desert sands, but the entire body of the Sphinx is protected from all desert winds coming from the West, the only winds that could effect erosion. Only the head protrudes from this hollow, and it shows no signs of erosion.”<sup>2</sup>

Indeed, the neck used to show extreme signs of erosion (see figures 6.1, 6.2, and 6.3, and figure 6.6) until it was strengthened in modern times by cement and concrete. As Zahi Hawass, secretary general of the Supreme Council of Antiquities of Egypt, has said “Baraize restored the head with cement, for at that time it was deemed necessary for the protection of the head. . . . The cement restoration of the head is not good and obscures the impressiveness of the Sphinx. Therefore, one suggests that Baraize’s restoration of the head be reversed.”<sup>3</sup> At the moment, the head is relatively free of signs of erosion, which is partially due to the fact that it was recarved by Pharaoh Amenemhat II and is thus much younger than the rest of the exterior of the Sphinx, and also because the stone of that part of the Sphinx is much stronger, as it comes

from a stronger stratum of the natural rock. Also, the face of the Sphinx that we now see is not the face that was seen in, say, 1900. In figures 6.4, 6.5, and 6.6, photos taken in the 1870s and 1880s, a huge gash can be seen in the upper left side of the Sphinx's face. This is one of many blemishes filled in with cement by Baraize in the 1920s, when he took as much care over the Sphinx's face as a plastic surgeon might with a modern film actress. The only thing the Sphinx hasn't had by now is Botox. But Schwaller de Lubicz's point certainly merits investigation.

Apparently the first person to take Schwaller de Lubicz's comments seriously and to investigate them further was an American, John Anthony West, in the late 1970s. This is when I unexpectedly became involved. Between 1978 and 1980, my friend Randall Fitzgerald and I jointly edited a magazine dealing with the frontiers of science and knowledge called *Second Look*. We worked very happily together as editors and had a model collaboration; we never had any disagreement that I can remember, so the recollections are very pleasant. Our interests did not wholly coincide, as Randy was keen on some things that did not particularly interest me, and I was more interested in advanced theories in physics. We published the first popular articles anywhere on such subjects as twistor theory and the multiple-universes interpretation of quantum mechanics (which I wrote jointly with Roger Penrose and David Deutsch, respectively). Suddenly, out of the blue, one of our readers submitted an unsolicited article about ancient Egypt. His name was John Anthony West, and the article was entitled "Metaphysics by Design: Harmony and Proportion in Ancient Egypt." I enthusiastically agreed to publish this article because I thought such things needed airing, the article was fascinating, and the matters it discussed were of the greatest possible interest, although I disagreed with West's ideas of Atlantis and his notion that the Sphinx was more than 12,500 years old. However, as editors, we made it our policy not to allow personal disagreements with the opinions of authors to influence our decisions about publishing their ideas. The article duly appeared in our issue for June 1979.<sup>4</sup> Some months later, West brought out a book carrying his arguments much further, entitled *Serpent in the Sky*.<sup>5</sup> By this chain of events, without agreeing with him, Randall and I thus became the first publishers of West's ideas that the Sphinx was of immense antiquity, far older than the archaeological record could possibly justify. Schwaller's observation about water erosion is a fundamental one that needed attention, and who is to say that anyone would ever have called vociferous attention to it if West had not done so? When I first met West in the 1990s, he said he had forgotten about the article he did for our magazine and that he had no copy of it, so I was able to send him one for his files.

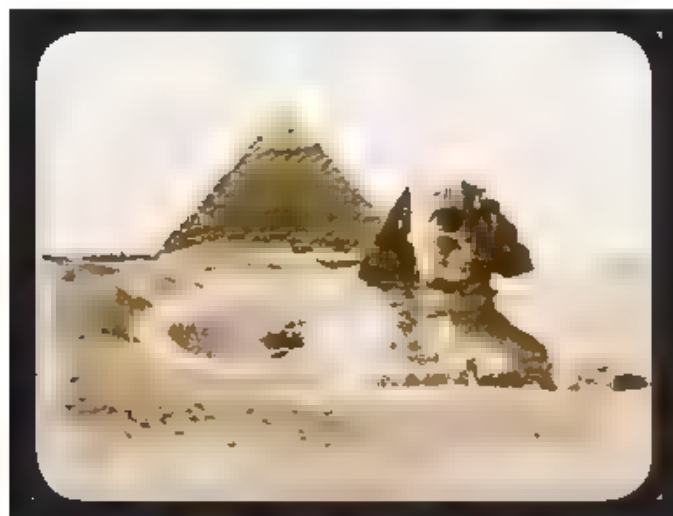


Figure 6.1. This photo dating from circa 1860–80 shows the extreme neck erosion of the Sphinx before it was "restored."  
(Collection of Robert Temple)

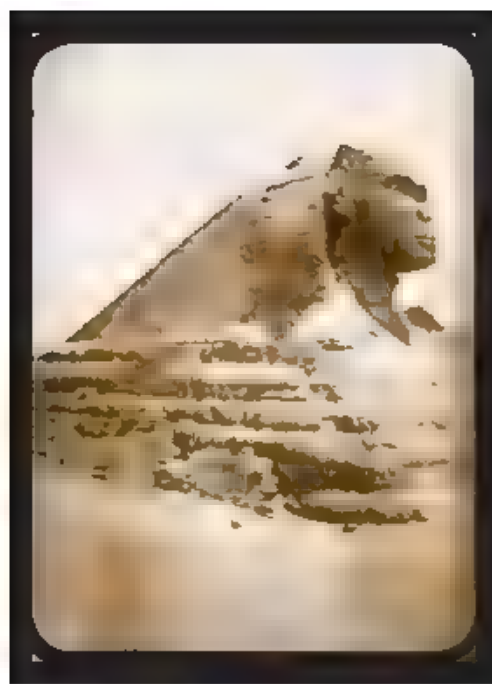


Figure 6 2. This photo, taken probably in the 1920s, shows the neck erosion of the Sphinx and the curiously pathetic attempt to fill holes in the right (southern) side of the Sphinx with stone blocks. They may have been covering an entrance into the Sphinx's body near one of the southern cupolas, or these blocks may merely be filling unsightly hollows. However, they were clearly intended to cover something, whether cosmetically or otherwise. This evidence should be taken into consideration when trying to decide whether the cupolas block an entrance to the body of the Sphinx. (*Collection of Robert Temple*)

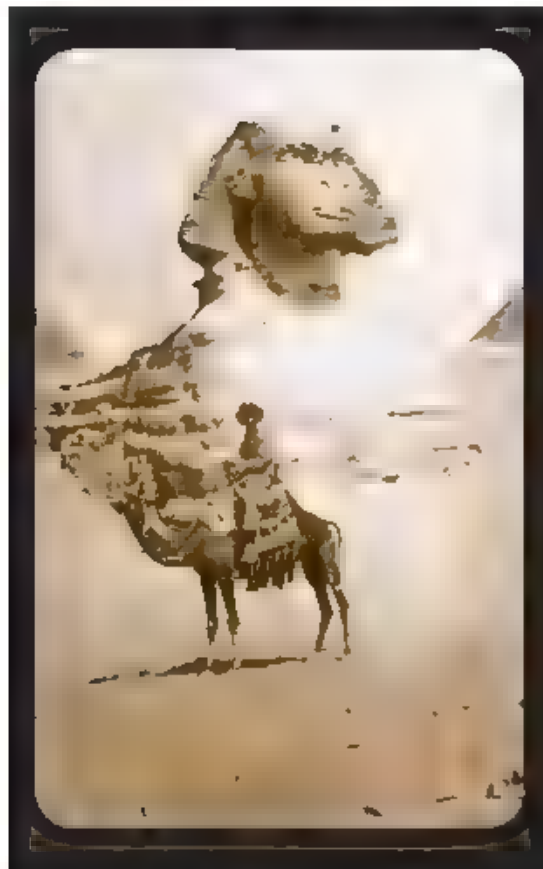


Figure 6 3. This photo of a European soldier on a camel probably in the 1920s, shows the same neck erosion and stone blocks on the southern flank of the Sphinx as we saw in figure 6.2 the photos were probably taken on the same day as part of this man's tourist visit. (*Collection of Robert Temple*)

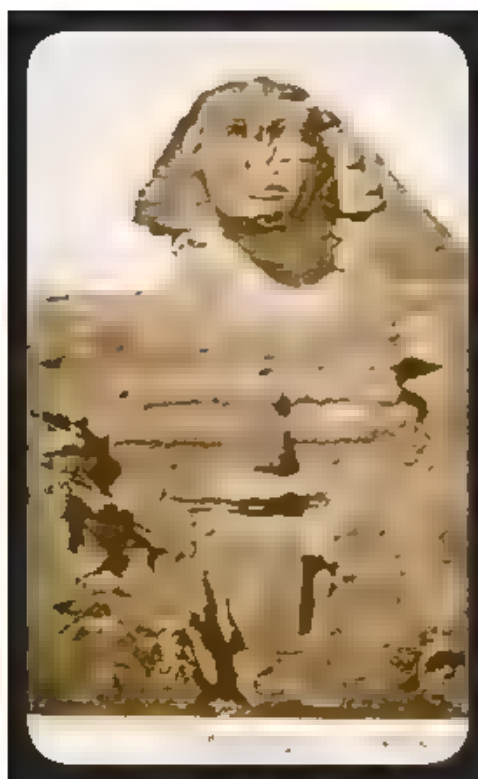


Figure 6.4. A photo taken of the Sphinx in 1893 by Emil Brugsch, showing the gash in the Sphinx's left forehead. (*Collection of Robert Temple*)

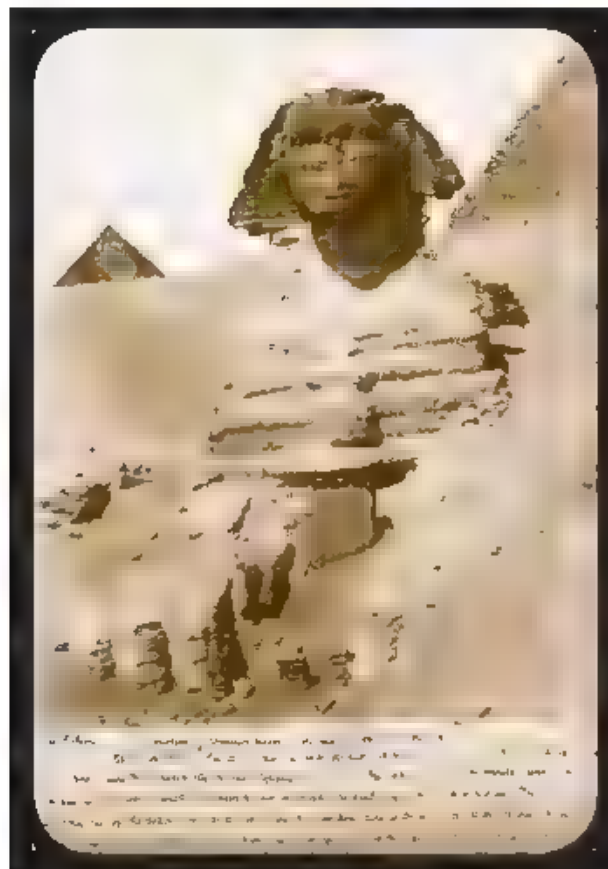


Figure 6.5. A photo of the Sphinx by G. Sarolides, probably from the 1870s. The altar where offerings were made sits in front of the chapel between the paws. This photo shows clearly the huge gash in the Sphinx's left forehead and the stump of the left lappet of the headdress. The original caption, written by hand, says "The Sphinx. An emblem of sovereign power—intellect joined with strength. It is not known when or by whom it was erected, it was in existence when Cheops some 3000 years BC reared the Great Pyramid. Its body is in the natural rock and measures 140 feet in length. Its paws 50 feet in length, are built up of huge hewn stones. The head is carved out of the solid rock and measures 30 feet from brow to chin, and 14 feet across. From a sanctuary between the lion like paws, sacrifices were offered to the divinity it was supposed to represent." (*Collection of Robert Temple*)



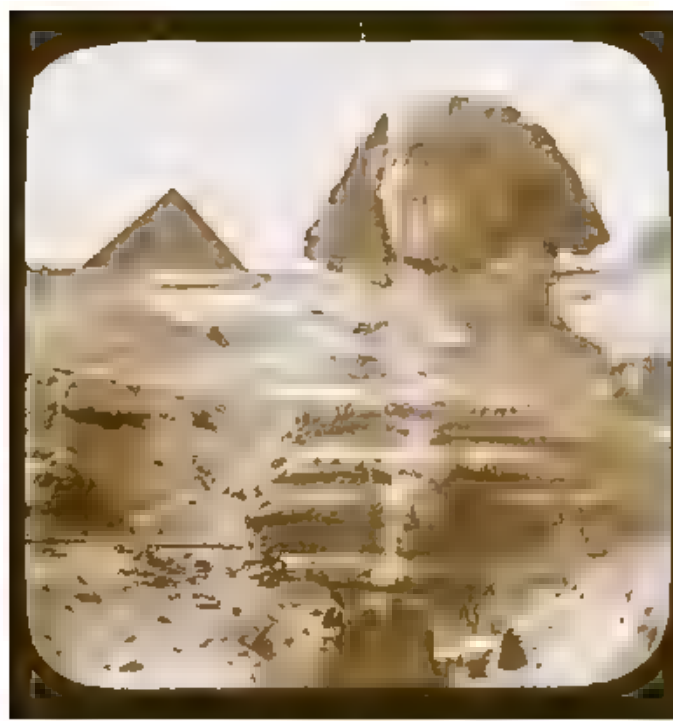


Figure 6.6. A glass lantern slide circa 1880, showing the gash in the Sphinx's left forehead and the stump of the left lappet of the headdress (Collection of Robert Temple)

The other two popular writers who have campaigned for the idea that the Sphinx is of immense antiquity are Graham Hancock and Robert Bauval, authors jointly and separately of various books on the subject. I know Graham slightly, and Robert rather well, although we have lost touch these days. We all mutually accept the fact that we are in disagreement about the extreme antiquity of the Sphinx.

In principle, it is understandable that these three authors have been driven to what I consider an extreme and untenable position with regard to the age of the Sphinx, because they take seriously the apparent signs of water erosion in the Sphinx Pit. And since Egypt is not known for heavy rainfall today, they have concluded that such water erosion must have been caused at a time when there was much heavier rainfall in Egypt than there is now. This superficially *seems* reasonable, although I do not believe it really is. They propose a date of about 10,000 BC for this heavy rainfall, which may or may not be justifiable. We come across conflicting claims about the climate so long ago, but I have not personally made a particular study of the ancient climate. I was never convinced by this argument from the very beginning for the simple reason that there is just no archaeological record at all for any important civilization during approximately seven thousand years of the time postulated between the “ancient rain” and the apparent beginnings of high civilization in Egypt. Whereas I am the first person to agree that there are curious anomalies about these beginnings, I cannot take seriously the suggestion that the beginnings were separated from any other signs of activity by seven thousand years of nothing. And trying to invoke the hypothesis of Atlantis seems a desperate measure, since Atlantis is a *speculation*. In other words, the logic seems weak and the evidence fragile. One idea often suggested by Robert Bauval is that the Sphinx was a lion statue that was somehow associated with the constellation of Leo rising at the spring equinox at an extremely early date. Since there is no evidence whatsoever that the constellation known to us as Leo was associated with a lion prior to the very last centuries BC in Egypt (when Babylonian influence crept in), and certainly not at some immensely remote era before that, this does not seem a feasible hypothesis. It is simply not an Egyptian tradition prior to the Ptolemaic Period.

There is plenty of evidence, as we shall see, for an alternative explanation of the signs that appear to indicate water erosion in the Sphinx Pit. And as we shall see later on, what I have to suggest is not incompatible with objections to the flowing-water erosion theories raised by Professor Lal Gauri, who

has made the most intensive geological study of the Sphinx of anyone in history, is one of the world's leading experts on limestone and its erosion processes, and strongly believes the "ancient rain" theory to be completely wrong, and I certainly agree with him.

One thing that has gone awry in the discussions of the ancient-rain theory of the Sphinx is that Egyptologists have been so horrified by this rain-erosion theory that they have attempted to counter it by denying that there are any signs of water erosion in the Sphinx Pit at all. This is a severe tactical error and merely makes members of the general public believe that the Egyptologists are being silly or stupid, or perhaps worse. The apparent evidence of water erosion is so blatantly obvious to anyone that for someone supposedly knowledgeable wholly to deny it looks disingenuous. In fact, my criticisms of "consensus reality" in the last chapter cannot apply to the signs of water erosion, for Schwaller de Lubicz has already challenged this consensus reality and pointed out that those particular new clothes of the emperor were missing. It is to the credit of West, Hancock, and Bauval that they so passionately seconded this, even if their reasoning from that point on was doubtful. But Egyptologists are making a big mistake in taking refuge in their bunkers. They should not feed the ancient-rain theory speculations by uninformed opposition or contempt alone. What we now have is a situation where neither side is right, and the arguments that have raged between them for years are all spurious and a waste of everyone's time.

So how does one resolve this situation in a reasonable way? I think the starting point is to take seriously the possibility of water erosion in the Sphinx Pit. It certainly looks as if there was a great deal of it in very ancient times. Then one has to think: How can this have been caused, if not by "ancient rain"? Certainly, as we shall see later, exposed subterranean water-erosion channels in the limestone (which is rich in such caves) were revealed by the excavation of the Sphinx Pit, and these geologically ancient channels have been further eroded since exposure. Partially this has been by natural processes that involve dew in microscopic pores, cold temperatures at night and hot ones during the day, even occasional rainstorms, and so forth. But I believe a substantial standing body of water was near at hand to increase the sources of moisture in the air, so that the processes were caused not just by dew and a rare rain shower. And furthermore, I shall describe later very specific causes for vertical scouring of the Sphinx Pit walls by water that has nothing whatsoever to do with rainfall. But first let us establish the central answer to the riddle:

*I believe that the Sphinx Pit was once a moat filled with water, and that the Sphinx was an island.*

The first objection that anyone might raise to this suggestion is that the Sphinx Pit is open at the east end and enclosed by cliff faces on only three sides (north, south, and west). So how could it have been a moat? However, it was on the east side that the water from the inundation of the Nile was to be found, from which the water to fill the moat must have come. We have already encountered quays in front of the Valley Temple and heard the evidence that in ancient times the water of the Nile lapped at the foot of the Sphinx Temple and the Valley Temple and may well have overflowed into them on occasion. (It was only 660 feet away, even as recently as the seventeenth century, during the inundation.) I believe it is highly possible that the floor of the Sphinx Temple was annually flooded and was intended to be, as I shall explain further a little later on. Although not visible to the naked eye today, additional ancient quays have been excavated directly in front of the Sphinx Temple. They are shown in the early aerial photograph in figure 6.8, before they were covered over again with windblown sand.



Figure 6.7 A Victorian engraving of the pyramids of Giza at the time of the inundation (*Collection of Robert Temple*)

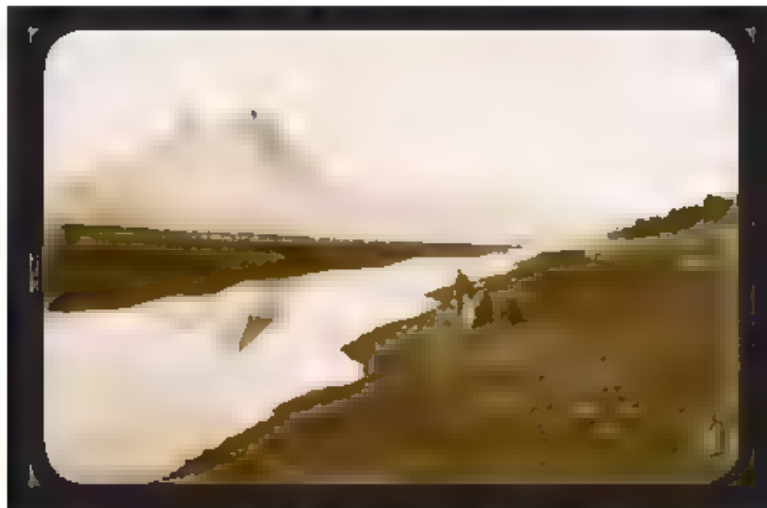


Figure 6.8 This late-nineteenth-century photo shows the Giza pyramids in relation to the low-water level of a branch of the Nile. The people are on an extended mud bank. At inundation, the water rose nearly to the level of the trees growing along the artificial bank of the Pyramid Road, which is at far right. During the Old Kingdom, the Nile was much farther toward the pyramids and rose much higher than in the nineteenth century, lapping at the door of the Sphinx Temple (not visible here, to left of photo, where the plateau slopes down). (*Collection of Robert Temple*)



Figure 6.9 This photo is from a glass lantern slide taken circa 1900 or earlier from the Giza Plateau at the foot of the Great Pyramid, looking back toward distant Cairo. Victorian visitors are arriving as tourists. In the background is the long road leading

into Cairo which runs across a completely empty floodplain. In those days, before the construction of the Aswan Dam, the annual inundation of the Nile spread across this plain and lapped at the foot of the Giza Plateau. In the long, thin strip on the horizon, Cairo is faintly seen. Today, the floodplain has dried out completely and has been built upon. Cairo now extends from the distant horizon seen here all the way to the pyramids, and the main Pyramids Road, built on top of the trackway seen here, is now an artery of crazy traffic surrounded by modern buildings inhabited by millions of people. The population of Cairo, which at the time of this photo did not exceed six million, is now unquantifiable: estimates vary between fifteen and thirty million, depending on how many drifters, vagabonds, and homeless one counts, whether the estimated two million squatters in the City of the Dead are included, and so forth. The only thing that is certain about modern Cairo is that there are too many people, and since Egyptians believe it is a good thing to have as many children as possible, the population is exploding. (*Collection of Robert Temple*)

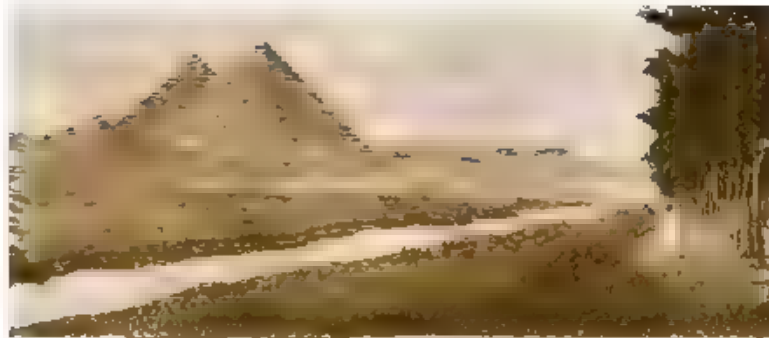


Figure 6.10. This is how the Giza Plateau appeared toward the end of the nineteenth century as seen from the tree-lined road leading from Cairo to the pyramids (on right). The Nile is low at this point, as it is not inundation time. (*Collection of Robert Temple*)



Figure 6.11. This French photo from the late nineteenth century shows the pyramids on the Giza Plateau in the background, from the banks of a part of the Nile when it is at a low level. It resembles figure 6.10, the road leading to the pyramids from Cairo is out of sight to the right, where the land to the left is the floodplain seen in figure 6.9, which would be covered by water during the annual inundation. (*Collection of Robert Temple*)



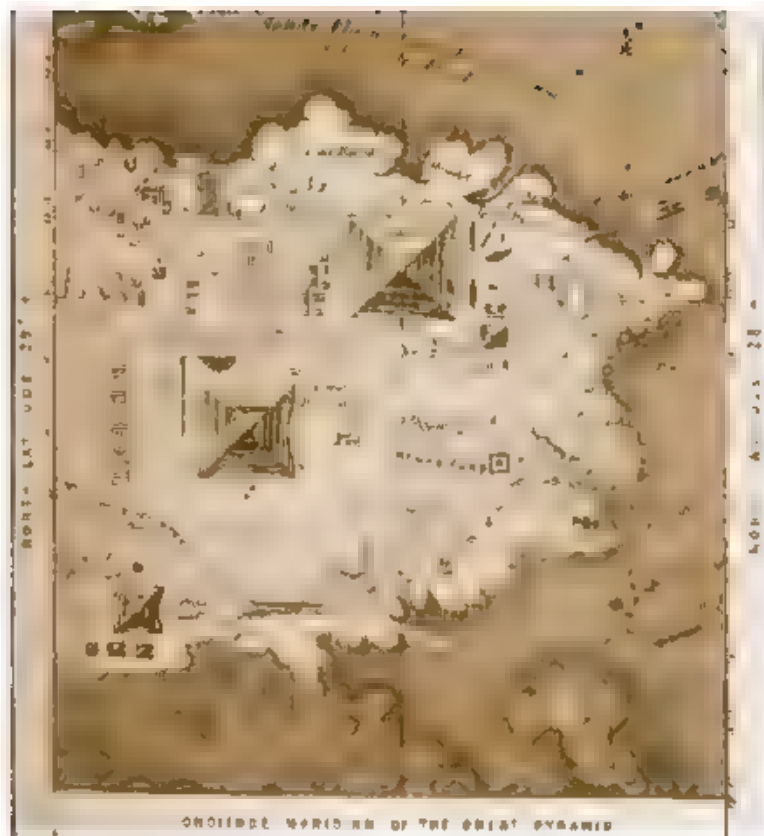


Figure 6.12. Charles Piazzi-Smyth's plan of the Giza (he spells it "Jeezah") Plateau, the pyramids, and the Sphinx, reproduced from his book *Our Inheritance in the Great Pyramid*, London, 1874 (folding plate III). Piazzi-Smyth's main purpose was to discuss the geodetic siting of the Great Pyramid and its longitudinal north-south meridian line, which bisects it, as shown here. However, for our purposes in connection with the Sphinx, this plan's usefulness is for showing in graphic color the Old Kingdom Nile floodplain (represented as brown). It shows that the Sphinx lies near the edge of this floodplain, at the right of the tan area. The word "Sphinx" is written in front of it, on top of the mound that concealed the still undiscovered Sphinx Temple. The structure we now call the Valley Temple is labeled here "King Shafre's [Khafre's] Tomb." The "Southern Causeway" is the top of a massive megalithic wall known today as the Wall of the Crow, which may well have had the double function at that time of acting as a causeway during the inundation period. The Chephren Causeway was still unknown at this time and is not depicted. The square called "Cheops Tomb" is what is today called Campbell's Tomb, and we have no idea who was buried in it; it is slightly north of the Chephren Causeway and is not open to the public, having a deep and dangerous open shaft. The "Northern Causeway" is the Cheops Causeway, now obliterated by housing. At this time, an extension of it into the floodplain area was still used, as it had been for millennia, as a genuine transport causeway across the flooded plain. Its use for that purpose is described in many of the early travelers' reports. This part of the Cheops Causeway was not only maintained by the reigning Mameluks and Turks but probably also extended by them, so no one knows where the authentic Cheops Causeway really ended and where its more recent extension, dating perhaps from the Middle Ages, commenced. In any case, none of it past the plateau's edge can be traced today, so we will never know. Because Piazzi-Smyth was an astronomer, his cardinal points as indicated on this plan are to true north and south rather than magnetic compass directions, in contrast to so many plans by archaeologists who do not even know the difference between geographical north and magnetic north. (*Collection of Robert Temple*)

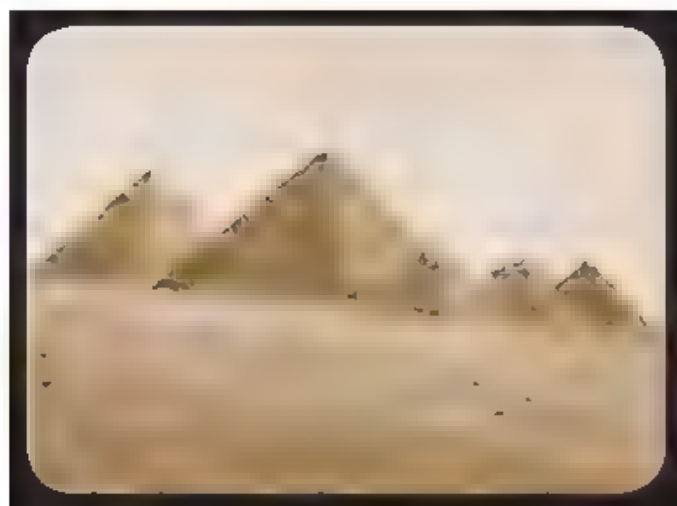


Figure 6.13. This old photo, probably dating from between 1860 and 1890, has a handwritten inscription on the back: "View of the

Pyramids after the Nile has receded " The view is an unusual one, taken from the southwest, with the Pyramid of Mycerinus and its three tiny satellite pyramids in the foreground and the Pyramid of Chephren in the background on the left. (The Great Pyramid is obscured and cannot be seen behind the Pyramid of Chephren from this angle.) The reference to the receding of the Nile is, of course, to its receding after the annual inundation (which no longer happens because of the Aswan Dam) The photographer's comment seems to imply that during the nineteenth century, the Nile at the inundation sometimes extended up to this southwest corner of the Giza pyramid field. I have come across other evidence that suggests that the inundation water did indeed swirl around to this location. In fact, the satellite photo seen in figure 6.22 shows walls and structures near the Pyramid of Mycerinus that I think may have been connected with a facility for unloading stones and building materials from barges. I believe this was the "tradesmen's entrance" to the Giza Plateau. (*Collection of Robert Temple*)



Figure 6 14. A view from the Sphinx Temple looking westward along the south side of the Sphinx's body with the Chephren Causeway on the left and the Pyramid of Chephren in the distance. The edge of the Sphinx Pit shows evidence of a continuous horizontal watermark from when it was filled with water as the Sphinx Moat, and that was the level of the water surface. As for the body of the Sphinx, on the right, this angle of light enables us to see clearly the smearing of the body with modern cement, like icing spread on a cake. The top portions of the Sphinx body visible here are the actual carved rock (in a highly eroded state), whereas the lower portions are reconstituted of repair blocks and the smeared cement has been used to fill in the holes in both.  
(*Photo by Robert Temple*)



Figure 6 15 This is one of the spectacular aerial photos taken in 1992 from a low-flying aircraft by Marilyn Bridges and published in her large-format book *Egypt: Antiquities from Above* (Bulfinch Press, New York and London, 1996) This photo reveals many crucial features of the Sphinx and its surroundings, which are not so easily visible in any other view. The prominent road on the right is the modern access road to the pyramids for tourist buses that enter the Giza Plateau from the village to the east of the Sphinx, known in Arabic as Nazlet el Samman but called Busiris in ancient Greek and Djedu in ancient Egyptian. The Sphinx Temple is visible at the foot of the Sphinx, as discussed previously, it was covered in sand and completely forgotten from circa 2000 BC until the 1930s. The temple to the left of it is called the Valley Temple and is connected by the Chephren Causeway to the Pyramid of Chephren, higher up the hill. The Valley Temple is partially open to tourists, whereas the Sphinx Temple is not. The

little square temple to the right of the Sphinx, built at an angle, is a small and not very interesting New Kingdom edifice honoring the Sphinx. It was built in ignorance of the existence of the Sphinx Temple, which was covered in sand by then. The square black hole in the sandy area behind the Sphinx is the shaft grave known as Campbell's Tomb

I would like to call attention to the tiny size of the Sphinx's head (seen also clearly in the horizontal wide-angle photo I took for figure 3.15). Also visible in this view is the tapered waist of the original carved figure, which is typical of a dog but not of a lion. The paws of the Sphinx, front and back, are essentially artificial, having been heavily reconstructed in Greek and Roman times and further reconstructed in modern times, so their leonine appearance is not authentic or original. The nature of the Sphinx Pit, in Old Kingdom times the Sphinx Moat, is dramatically obvious here. The wall of the Sphinx Temple on the side facing the Sphinx (the temple's western wall) was the barrier to the water in the moat. The water was led into the moat through the channel between the two temples, here seen in deep shadow, and the sluices to retain the water were at its western end (see my photos of the traces of those sluices in figures 6.31 to 6.42). The water of the Nile at the period of the annual inundation during the Old Kingdom (the Pyramid Age) lapped at the feet of the two temples, where there were quays which have been partially excavated. Raising the water from that level to the level of the slightly higher Sphinx Moat was not a problem (see figures 6.23 to 6.27). The Sphinx Moat in the Old Kingdom was the sacred lake known in the Pyramid Texts as Jackal Lake, because the crouching Anubis sat in the middle of it. It also had other names and honorific titles such as Lake of Fire, Canal of the God, Canal of Anubis, Winding Waterway, Lake of Cool Water, and Lake of Life. The four sacred jars containing the internal organs of each deceased pharaoh in Old Kingdom times were ceremonially washed in the waters of Jackal Lake after his death, before they and his mummy were placed in his tomb. Every year, possibly in connection with the annual Festival of Sokar (see figure 7.22), the pharaoh made a ceremonial journey around the statue of Anubis in a little boat; the remnants of a tiny landing stage for this ceremony appear to survive in the center of the west wall of the Sphinx Temple. Another place of descent into the Sphinx Moat seems to have been at the northeast corner of the Valley Temple (see figures 6.41 and 6.42). The dredging of the Sphinx Moat, which would have been a drastic necessity several times a year because of the problem of the windblown sand, must have taken place at several points, one of which is the vertical crevice in the bedrock on the left side of the Sphinx Pit in this photo, in the center (shown also in figure 6.57, where Olivia is seen climbing up it). The vertical fissures in the bedrock due to water erosion, mistakenly imagined by some modern writers as being due to impossibly prehistoric ancient rain, were caused by the repeated dredging over several centuries, which resulted in vast torrents of water pouring back down into the moat after each dredging effort. The greatest amount of sand would have accumulated at the west end of the Sphinx Moat (supported by modern archaeological evidence discussed), and the shelf left in the Sphinx Pit there seems to have served as the primary service access for the maintenance of the moat. The ancient name for the immediate area around the Sphinx, and in particular for the Valley Temple, was Rostau (or Rosetau). There are reasons to believe that the Valley Temple was originally a Temple of Sokar (later called a Temple of Osiris by the time Osiris had largely replaced Sokar in religious mythology), the original lord of the underworld, but that Pharaoh Chephren, who may have had ego problems, turned it into a shrine for himself and filled it full of his own statues. We are deeply indebted to Marilyn Bridges for the immense trouble she went to in her struggles to get permission to take her invaluable aerial photos of ancient Egyptian monuments. (Photo copyright © 1992 by Marilyn Bridges)

Mark Lehner describes these quays that cannot at present be seen:

A quay or revetment in front of the Sphinx Temple was revealed by drillings, as much as 16 m (52 ft) deep. It probably continues south in front of the valley temple, from which point ramps lead to the two doors of the temple. . . . In 1995 Zahi Hawass recleared the area, revealing that the ramps cross over tunnels framed within mudbrick walls that formed a narrow corridor or canal running north-south. In front of the Sphinx Temple the canal runs into a drain leading northeast, probably to the quay buried below the modern tourist plaza.<sup>6</sup>

We must keep in mind also that the means of keeping water trapped in the Sphinx Moat on the east side was by means of the west wall of the Sphinx Temple. This rose up very high (see figures 6.16 to 6.18, 6.20, 6.50, and 6.56). Let us stop for a moment and think of just how bizarre it was for there to be this temple wall immediately in front of the Sphinx's face. There is no passage or doorway leading to the Sphinx from the Sphinx Temple. The Sphinx Temple sits directly in front of the Sphinx, and yet *you could not get to the Sphinx from the Sphinx Temple!*

If you think the Sphinx Temple was built for the purpose of worshipping the Sphinx, then you have to explain why there was no connecting passage or doorway between the two. The Sphinx was boxed in and blocked off and could not be approached from the building in front of it. Why would anybody do this?



Apart from that, the Sphinx Temple blocked the view of the Sphinx so that no one could see the Sphinx properly from the front. Imagine someone building a wall in front of the “Mona Lisa” in the Louvre, so that visitors to the museum could see the painting only if they brought along a portable ladder to stand on.

Since we are faced with the indubitable fact that this monstrous obstruction exists directly in front of the Sphinx, the only logical explanation is that this was done on purpose for a very good reason. I suggest that the Sphinx Temple’s west wall was the fourth wall of the Sphinx Moat. I am convinced that the Sphinx Temple’s purpose of obstructing the view was really to obstruct the outflow of the water in the moat, which had been brought in from the Nile at the time of the river’s rise at the annual inundation.

In 1739, Richard Pococke visited Giza and stated that at the inundation, the Nile rose to a point in that year that was only 660 feet from the Sphinx itself.<sup>7</sup> That is a distance of 220 yards (201 meters), which is only half the extent of a single circuit of an American high school track, the conventional circuit of which is a quarter of a mile, or 440 yards. It is only 10 percent more than twice the length of the 100-yard dash in American track events, which can be run in approximately ten or eleven seconds by a sprinter. Consequently, if we ignore the sandy surface and assume a firm surface, a sprinter in 1739 could have run from the Sphinx to the Nile in about 25 seconds at the time of the annual inundation. And that was after the Nile had moved considerably to the east, whereas it is known to have been much closer to the Sphinx in Old Kingdom times, and as previously mentioned, the level was 26 feet higher during the Middle Kingdom than it was in the eighteenth and nineteenth centuries



Figure 6.16. Looking up at the face of the Sphinx from the floor of the Sphinx Temple at its western end. The walls here are carved out of the solid bedrock, with limestone blocks added above. This western wall would have acted as a massive barrier to the outflow of any water from the Sphinx Moat during the Old Kingdom (*Photo by Robert Temple*)



Figure 6.17 The Sphinx seen head-on from inside the Sphinx Temple. What remains of the massive limestone west wall of the temple rises well above what would have been the water level of the Sphinx Moat when it was still in use. On the far side of the wall, just in front of the Sphinx (but today obscured by a spotlight installation), there are slight remains of a limestone platform where the pharaoh probably once stood alone for a ceremony, having disembarked from a small boat, as there were steps leading down on either side of this platform. *(Photo by Robert Temple)*



Figure 6.18. This view inside the Sphinx Temple shows the truly extraordinary erosion patterns visible on some of the stones. One has to remember that from about 2000 BC, this temple was entirely covered by sand, until it was rediscovered and excavated in 1936. All this erosion therefore had to take place before 2000 BC. If you go past the eroded stone at left and turn left, you are standing inside the northwest "magazine," which is a word used by archaeologists to refer to a storage space or room, seen in figure 6.19. I believe that with the inundation of the Nile during the Old Kingdom, the entire interior of the Sphinx Temple may well have been flooded for at least three months of the year. The two western magazines, which I believe held boats, would have had considerable water standing in them during that part of the year. *(Photo by Robert Temple)*

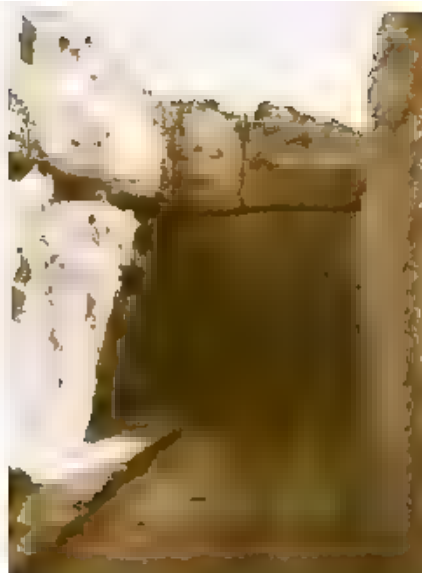


Figure 6.19. The Sphinx Temple has various strange design features. At the western end, there is a pair of these seemingly inexplicable chambers of a kind that tend to be called "magazines," that is they are assumed to have been storage rooms of some kind. This is the magazine in the northwest corner of the temple. The western wall of the temple is on the right. A twin of this chamber is in the southwest corner of the temple. Anyone's guess is as good as another's, but my guess about these two chambers is that they were used for the storage of boats, which were lifted out, passed over the wall to the right, and set down in the water of the Sphinx Moat for special ceremonies. The floor design suggests something of this sort, since it seems obvious that something was stored here that was long and narrow and had its bottom along the center, and the stone walkway surrounding the chamber on three sides suggests a means of access by foot to the sides and far end of something long and narrow. What could that be besides a boat? For those who refuse to accept the idea of a Sphinx Moat, the chambers could still have contained long boats nevertheless, since we know that sacred barques were carried in procession at Giza during the Festival of Sokar. I therefore suggest that the northwest and southwest magazines were storage chambers for long ceremonial boats, whether sacred barques that never touched water or real boats to be lifted over the wall and placed into the moat. *(Photo by Robert Temple)*



Figure 6.20. The Sphinx seen from within the Sphinx Temple at its eastern end. *(Photo by Robert Temple)*



Figure 6.21. This is the western end of the North Trench, which lies along the northern wall of the Sphinx Temple and is padlocked with an iron gate at the eastern end to keep tourists out. At the western end, the bottom half terminates in solid bedrock, as seen here with a man standing on it. The wall to the right is also solid bedrock, being the cliff face of the plateau. Olivia stands looking down at me from the top, in the center. The woman whose head is showing at the top right of the photo is the Egyptian antiquities inspector. The two men in the photo are Greek friends. That this passage ends in a bedrock barrier shows that it could not have served as a water channel in the same way as the channel between the two temples at the southern wall of this temple. This passage was made necessary by the construction of the Sphinx Temple, since otherwise its northern wall would have been laid flat up against a cliff. Some of the limestone blocks in the northern wall are gigantic and must weigh in excess of forty tons. The wooden walkway at the top is part of the modern access to the Sphinx Pit. The small New Kingdom temple of Amenhotep II (see figures 7.3 to 7.5) stands nearby, and the stones lying on top of the bedrock in the center may have been part of its New Kingdom foundations, though I do not believe the details of the stones and rubble at this point have been studied or recorded, and as they are now entirely covered by the wooden access ramp, I could not study them properly. But I suspect the disorderly stones and rubble that constitute the top level must have been added at the time the modern ramp was constructed. (Photo by Robert Temple)

Since a massive amount of water was ready at hand for filling the Sphinx Moat in Old Kingdom times, a point agreed on by all Egyptologists today, why not take the further step of assuming that it was actually done (see figure 6.18)? To raise the water that small amount was a relatively simple task with even the most primitive water-raising devices, such as the swape, or well-sweep, technically known as the counterbalanced bailing bucket, which is known to have been used in Old Kingdom Egypt.<sup>8</sup> (Its name in Arabic is *shādūf*. See figure 6.26.) For such a large volume of water, several of these of considerable size would probably have been used, and for weeks on end. But this posed no engineering difficulty even for a primitive people and certainly none to a people capable of building the pyramids! All that was needed for this task were time and plenty of laborers. Swapes were often used in large numbers simultaneously in Egypt:



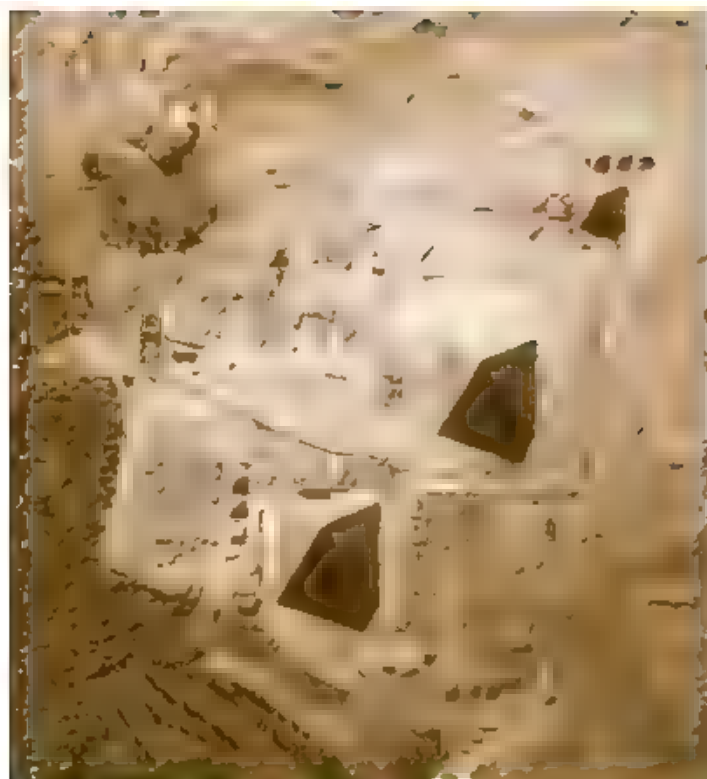


Figure 6.22 This is a NASA satellite photo of the Giza Plateau, supplied to me by my friend Simon Cox, to whom I am very grateful. Many strange features and buried structures invisible on the ground to the naked eye can be seen through the sand in this photo, particularly unexcavated walls around the precincts of the Pyramid of Mycerinus (top). Also, this photo shows that the row of tomb chambers behind (to the west of) the Pyramid of Chephren are not oriented north-south, as they seem to be when viewed casually at ground level. The Causeway of Mycerinus may be seen shooting off to the left and being lost in the sand. The Chephren Causeway, emanating from the Pyramid of Chephren in the center of the photo, shoots off to the left and ends at the Valley Temple, passing the Sphinx, which is below it in the photo. (The temple directly in front of the Sphinx is the Sphinx Temple.) The Great Pyramid is at the bottom, and in this view from above we can see that the west face (at right) has a line running down the middle, which is known as its apothegm, a slight indentation invisible from ground level; we can also see the track of the now demolished Cheops Causeway shooting downward and to the left, terminating at the cliff edge, although it once continued farther in the floodplain below, but is now built over. The town at the left in the photo is the vast, sprawling, and growing Nazlet el-Samman, which clearly wishes to gobble up Giza. In Greek and Roman times it was called Busiris, by the Napoleonic Expedition it was called Bousyr, in ancient Egyptian times it was called Djedu. The steepness of the escarpment rising from the floodplain to the plateau is best seen below the Great Pyramid, where the slope is a sharp one. The rectangular nodule beside the Great Pyramid, above it in the photo, is the modern structure built to house the ancient boat that was excavated from a boat pit and is now a museum. The three squares to the left of the Great Pyramid are known as the Queen's Pyramids. The snaking form threading through the middle of the photo is the modern road; it ends in an oval open area at the extreme left. If you look closely at the bottom (northern) edge of the Chephren Causeway in this photo, about halfway between the Sphinx and the pyramid, you will see a crescent-shaped hole just peeking out and extending beneath it—that is the entrance to the so-called Osiris Shaft at Giza. To the left is a square black hole—that is the shaft leading to what is called "Campbell's Tomb." Neither of these subterranean features is accessible to the public, or indeed to most archaeologists either. If you look at the area containing trees in the top left-hand corner, that is the modern Arab cemetery. Just to the left of it you can see a long wall shooting out to the left, which is called "The Wall of the Crow," which functioned as a causeway during the times of inundation. Above it in the sand is the area of the ancient workers' village. This photo shows how the inundation waters once swirled round from just in front of the Sphinx Temple in an arc to the area southward and eastward (south is top, just above the Pyramid of Mycerinus). Even until the twentieth century, floodwaters sometimes reached this far. The buried structures above and to the left of the Pyramid of Mycerinus may perhaps be the remains of a landing stage for barges during the inundation, for the transport of materials. The strange round shape at far right center is a stage where operas and events are staged for the public. (Photo courtesy of National Aeronautics and Space Agency, USA)

Batteries of swapes raising water in successive levels are often seen in Babylonian and ancient Egyptian representations, described in Arabic MSS. [etc.] . . . A later development was to elongate the bucket's spout into a flume . . . this being linked parallel with a counterweighted beam above, and so arranged that it automatically empties itself into the receiving channel on an upward motion. . . . This was really a combination of the ancient swape with another device, the *mote*, consisting only of



a scoop-shaped piece of wood suspended at its centre from a kind of a light derrick and used simply to scoop up the water. . . . In India the operation of the device is assisted by a moving counterpoise, i.e. by men who walk back and forth along the upper beam. . . . This is true also of the large *shādūfs* both in Egypt and in India. The *shādūf* will service a lift of from 4 to 10 feet [i.e., raise the water that high], and while the flume-beamed swape will not lift more than about 3 feet it will carry much larger amounts of water at each stroke.<sup>9</sup>



Figure 6.23. A simple water-raising device in use in ancient Egypt in an engraving of an ancient drawing from Adolf Erman, *Die Welt am Nil (The World on the Nile)*, Leipzig 1936 figure 2, in the section "Land and People." The caption merely says "Bucket in ancient times." This is apparently of New Kingdom date.

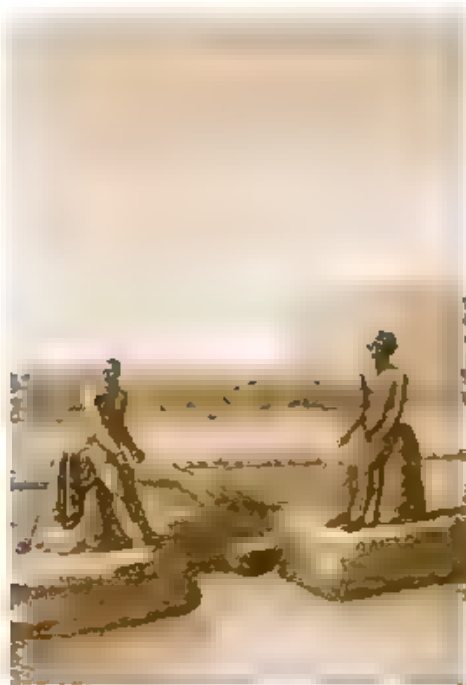


Figure 6.24. It took only two men and a bucket to move a significant amount of water at a single site in traditional Egypt. All they had to do was keep going. (Collection of Robert Temple)

Batteries of swapes would have been quite sufficient to raise the water the small distance to fill the Sphinx Moat (see figures 6.26 and 6.27). The water-raising machinery may have been more advanced than swapes, but the study of ancient Egyptian engineering, as far as I am aware, is too undeveloped for me to discover whether in Old Kingdom times the more efficient machines known as norias (see figure 6.25) or those known as pot chain-pumps (*sāqīyas*) or "camelwheels" (*daulābs*), later ubiquitous in Egypt, may have been known and used.<sup>10</sup> Whether the water-raising was accomplished in the slower and more elementary manner with swapes does not really matter, since there was no shortage of labor to accomplish this tedious process, and in engineering terms it was simply a brute-force method applied to an incredibly simple requirement, which the most primitive people could have managed easily. Raising

water to fill the Sphinx Moat was, compared to building even a small pyramid or excavating a deep shaft, mere child's play.

We have other evidence that this sort of thing was routine in ancient Egypt. The Greek geographer Strabo (64 BC–AD 25) recorded in his *Geography* that a Roman encampment near the site of what is today Cairo received its water supply from the Nile by a system of wheels and screws operated by 150 men, which raised the water and transported it along a ridge.<sup>11</sup> The passage reads:

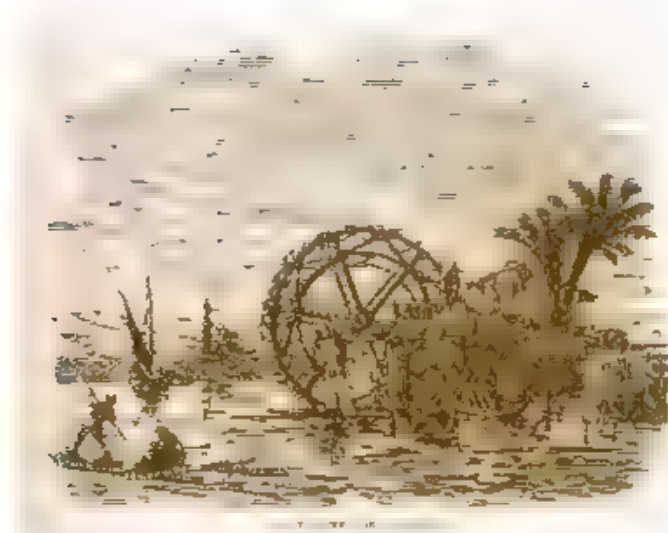


Figure 6.25 This is a noria water wheel, used for lifting quantities of water out of the Nile for irrigation purposes up until modern times. Although the noria did not yet exist in Old Kingdom times, as far as we know, it represents a successor to the *shadouf* system, which did exist then (see figures 6.26 and 6.27). At all times throughout history, the Egyptians have employed massive numbers of water-raising machines and shifted huge quantities of water. They were hydraulic engineers on a grand scale.  
(Collection of Robert Temple)



Figure 6.26. These engravings from the Napoleonic *Description de l'Égypte* (1809) show the details of the traditional Egyptian water-raising system known as *shadouf* in Arabic. With such a simple system, the entire Sphinx Moat could easily have been filled by Nile water, since manpower was essentially unlimited, and these devices could have been worked around the clock. The traces of sluices to control the water when it rose to the correct level are seen in figures 6.31 to 6.42, which I took just days before the evidence was covered over by modern "restoration" work on the northern foundations and base of the Valley Temple at Giza.  
(Collection of Robert Temple)



Figure 6.27 A view of a traditional *shadouf* water-raising system in operation circa 1798–1801, as portrayed in the Napoleonic *Description de l'Égypte*. This shows how only a dozen men at a time are needed to raise enough water from the Nile level of Old Kingdom times to the level of the Sphinx Moat. (Collection of Robert Temple)

In sailing up the river [the Nile] we meet with Babylon, a strong fortress, built by some Babylonians who had taken refuge there, and had obtained a permission from the kings to establish a settlement in that place. [This is incorrect, but was believed at that time. The name Babylon in Egypt has a different origin, and a tower of this “Fortress of Babylon,” or at least a more modern tower on the site of an even older one, now serves as the entrance to the Coptic Museum in Old Cairo.] At present it is an encampment for one of the three [Roman] legions which garrison Egypt. There is a mountainous ridge, which extends from the encampment as far as the Nile. At this ridge are wheels and screws, by which water is raised from the river, and one hundred and fifty prisoners are [thus] employed. The pyramids on the other side [of the Nile] at Memphis may be clearly discerned from this place, for they are not far off.<sup>12</sup>

For holding the water within the Sphinx Moat, all that was necessary was the western stone wall of the Sphinx Temple and a strong sluice gate in the passage between the Sphinx and Valley Temples. The water must have been led into the Sphinx Moat along this passage that separates the Valley Temple from the Sphinx Temple (see figures 6.28 to 6.30), and that connects the area to the east of the temples, where the Nile water was, and the Sphinx Moat directly. As we shall see in a moment, I have discovered and photographed evidence there of ancient sluice gates

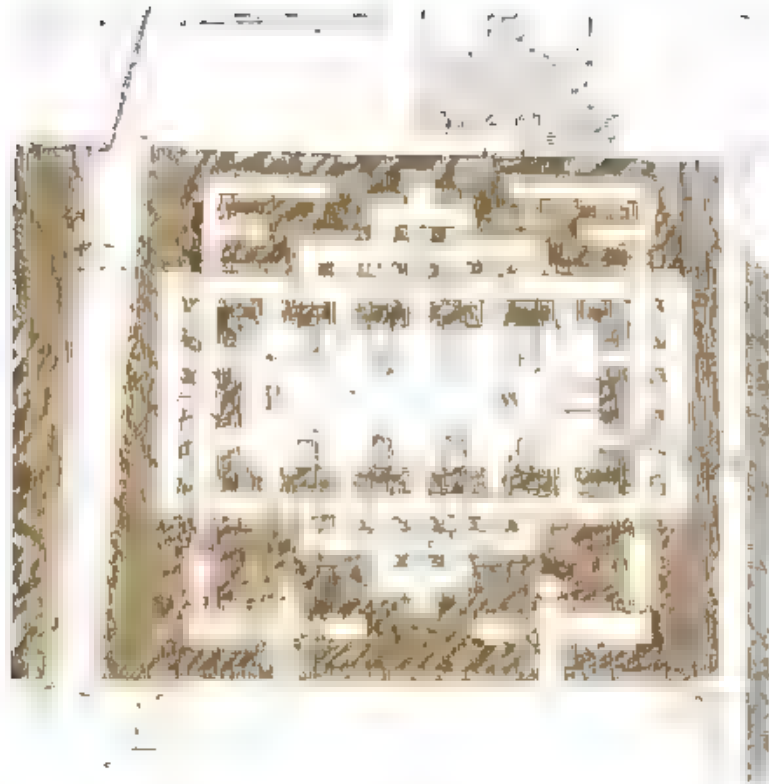


Figure 6.28 This is probably the most accurate ground plan of the Sphinx Temple ever published. This remarkable labor of love was accomplished by the German archaeologist Herbert Ricke, based on his excavations and surveys. He did not use the usual term Sphinx Temple for the building but called it the Harmachis Temple after the god Harmachis (a late name for the statue of the Sphinx after it was deified). However, it is too confusing to have two names for the same temple, so we use the more usual name of Sphinx Temple, which all the English-speaking archaeologists use. This is the temple closed to the public, that sits directly in front of the Sphinx, whose front paws and the pavement in front of them can be seen at the top of this drawing. Near the center of the (west) wall at the top of this temple plan, directly in front of the Sphinx and opposite the space between its paws, are two steps. I believe these to be the remnants of the place of descent of the pharaoh into his boat to sail around Sphinx Island, as described in the main text. It was probably also the place where the four jars containing the pharaoh's internal organs were ceremonially washed in the lake after his death, also as described in the main text. The main advantage of this plan for us, however, is the clear depiction it gives of the passageway between the two temples (shown here as a white corridor between the two dark buildings, at the left of the plan). This is the passage through which the flow of Nile water was regulated by means of sluices (traces of which are seen in figures 6.33 to 6.38) into and out of the Sphinx Moat. At the top left of the plan, the Chephren Causeway commences and abuts the northwest corner of the Valley Temple (the dark structure whose northern wall is shown at the far left of the plan). The photos in figures 6.37, 6.39, and 6.40 show the swirling water patterns in the stone at this point, caused by the rushing water when the sluices were opened and closed and figure 6.42 shows the remains of the stone stairs descending at this point into the sluiceway for purposes of maintenance and operation of the sluices. This passageway has now been so thoroughly restored with new stone blocks (see figures 6.31 and 6.32 for this work in progress) that all traces of its original surface, together with evidence of the sluices, have been obliterated, so my photos are the only record that remains of the true purpose of this passage and the means by which the ingress and egress of water were controlled and regulated. The North Trench shown to the right of the Sphinx Temple, which I have carefully explored (literally after jumping about 30 feet down into it), never went through to the Sphinx Moat, and the original rock of the plateau blocks it completely at its western end, though that is not particularly clear here. The North Trench therefore had nothing to do with regulating the water flow but was required to give space for the workers to construct the temple, as the north wall of this passage is a solid rock cliff, shown here in dark shading.

(The illustration is Plan 1, the folding plan at the back, of Herbert Ricke, *Der Harmachistempel des Chephren in Giseh* (The Harmachis Temple of Chephren at Giza), in the series *Beiträge zur Ägyptischen Bauforschung und Altertumskunde*, Vol. 10, see notes to main text.)





Figure 6.29. Looking from the water channel between the temples toward the modern gate across the entrance into the Sphinx Moat. On the right is the southeast corner of the Sphinx Temple (*Photo by Robert Temple*)



Figure 6.30. This view from the top of the north wall of the Valley Temple shows clearly how the Sphinx Moat ran directly out and into the northwestern corner of the Valley Temple circumventing the Sphinx Temple, which acted as the moat's eastern barrier. Indeed, from this viewpoint we can appreciate how the strange angle of the southern wall of the Sphinx Moat had a clear purpose, which was precisely to lead the water around the Sphinx Temple and into the narrow channel where the sluice gate was, which regulated the level. The remains of the Sphinx Temple are on the bottom right of this photo. The barred metal barrier closes off this narrow access today so that people who are admitted into the Sphinx Pit cannot wander down between the two temples (*Photo by Robert Temple*)

Figure 6.34 is a photo I took (as a result of my special access to the site) of the northwest corner of the Valley Temple, showing what appear to be long lines of water erosion along the base, following the entire line of the passage that would have led to the Nile in ancient times. I photographed all this evidence at the very last minute in 2001. The scaffolding was for the restoration of the wall, already well under way at the time, whereby new stone was laid over the original surface, wholly effaced all these ancient indications of water erosion and destroyed all such evidence forever. No one can ever take my photos again! (See figures 6.31 and 6.32 ) Unexplained holes as well as larger indentations are seen in the original stones, which indicate that in some previous era wooden, brick, metal, or detachable stone fixtures were inserted into them. Figures 6.33 to 6.38 show evidence of carved indentations and depressions in the stone of the north wall of the Valley Temple that appear to be slots for sluice-gate mechanisms. There are also bolt holes drilled into the wall, apparently for fastening the sluices with metal bolts.



Figure 6.31. The north wall of the Valley Temple undergoing restoration. Modern pieces of limestone have been cut and inserted into holes, cement has been smeared all along depressions to even them out. All traces of anomalies are being erased. This is despite the fact that tourists never come here and never will. The horizontal lines showing ancient water erosion run along the lower wall at a level above the base blocks. (Photo by Robert Temple)



Figure 6.32. The eastern end of the north wall of the Valley Temple during restoration. We see piles of modern blocks of stone lined up to be placed and cemented against the base of the temple wall, which will forever obscure its true features and render impossible any closer reconstruction of what was going on here in the Old Kingdom. The Sphinx Temple is to the left of this photo and cannot be seen here. (Photo by Robert Temple)



Figure 6.33. This photo is taken looking due west, from the floor of the water channel between the two temples. To the upper right is the iron gate sealing off access to the Sphinx Moat. The limestone directly ahead at the end is natural limestone bedrock. The

stone on the left is the north wall of the Valley Temple. Immediately to the left are two ancient bolt holes. The long, dark, vertical pole is part of some modern iron scaffolding erected for the process of "restoring" this wall—in other words, destroying all the ancient evidence in the interests of tidying up, filling in, and smoothing out, which is precisely the mentality that turned the Sphinx into something worse than a Botoxed movie star, resembling Lenin's corpse more than an ancient monument. The horizontal erosion lines on the Valley Temple's wall show clearly that the water level was kept constant during the inundation period up to the level of the Sphinx Moat's bedrock floor. These standing-water lines indicate very clearly that the channel was never dry during that portion of the year. The thin path of stones laid along the channel and leading toward the ancient stairs is a modern pathway for workers. The lumpy stone at lower right is the remains of a platform with indentations for sluices and mechanisms at its base. Only the single stone seen protruding at the center right is part of the south wall of the Sphinx Temple. (Photo by Robert Temple)

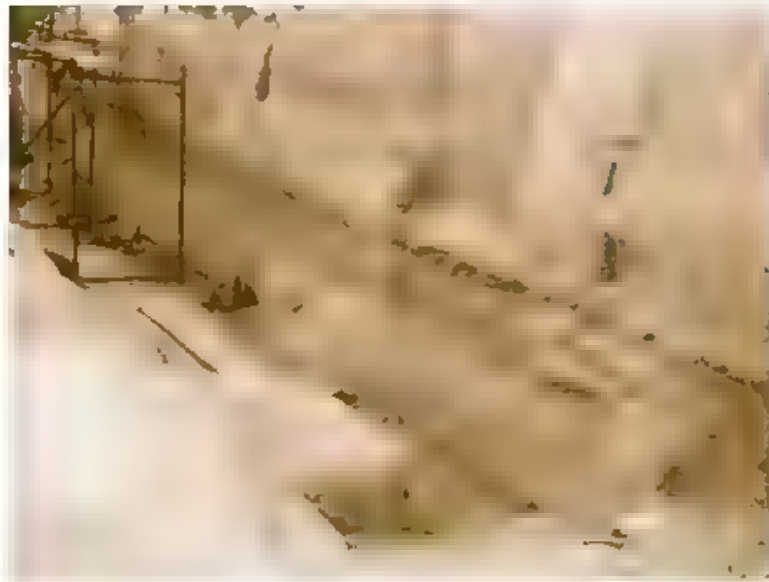


Figure 6.34. In the foreground, the steps descend into the passage between the Sphinx and Valley Temples, with the Valley Temple's north wall on the right. Just beyond the steps are the two indentations carved out of the rock that appear to be connected with the use of a bolt. Beyond them is the long vertical slot carved out of the rock, possibly in connection with a thick sluice gate. The protruding limestone blocks along the bottom of the passage on the right exist only here, from the steps to the other side of the apparent sluice gate depression. They may thus have been required only in association with a sluice gate at this point. The scaffolding at left was being used at the time these photos were taken to restore this wall, thereby obscuring its ancient features forever. I believe the long horizontal striations along the base of this wall are from water erosion. The water was generally kept standing at that level during inundation time, and the thick sluice gate would have commenced only above that level (at the base of the carved depression) to regulate and retard inflow and outflow higher than this level to keep the moat level stable. There would have been a great deal of water pressure against this sluice gate, which effectively held back the entire Sphinx Moat contents. This would explain its extraordinary thickness. It is possible that the carved depression may have been for a sliding stone counterweight. It is a tragedy that the clumsy restoration of this wall has obliterated so much evidence that might have been examined more closely. (Photo by Robert Temple)



Figure 6.35. The northwest corner of the base of the Valley Temple. The cubicle at the far corner of the base of the temple is at extreme right. Steps lead down into the passage running between the Sphinx and Valley Temples. We see clear traces here of indentations and depressions cut into the base of the Valley Temple, which seem to be evidence of a sluice at this point to control the inward and outward flow of Sphinx Moat water. Just above the bottom step is what appears to be the receptacle hole for a bolt.

carved out of the rock. A carved slot for what may have been part of a thick sluice gate is in the upper central portion of the photo  
(Photo by Robert Temple)



Figure 6.36. This photo shows particularly well the indentations cut into the left side of the base of the eroded stone platform at the right of the photo and, at the left, the Valley Temple's north wall for the various sluice mechanisms, counterweights, bolts, and barriers to control the water flow into and out of the Sphinx Moat during the inundation period. The south wall of the Sphinx Temple is out of view to the right. The cubicle cut out of the bedrock is out of view to the left at the end of the Valley Temple's wall. It may be seen in figures 6.37, 6.41, and 6.42. The horizontal water erosion marks in the lower portion of the wall of the Valley Temple are here very clear, resembling those that continue along the bottom of the Sphinx Moat beyond. It should be remembered that the Valley Temple wall is made of limestone blocks, which is why its watermarks are perfectly horizontal, whereas the wall of the Sphinx Moat is solid bedrock, which is why its eroded strata follow the softer layers of limestone in the bedrock and are not precisely horizontal, although the causes for the two sets of watermarks are the same, namely standing water over periods of centuries. (Photo by Robert Temple)



Figure 6.37. Detail of the base of the Valley Temple wall at the northwestern corner. On the extreme right is the base of the cubicle and at bottom left are the steps. The possible bolt holes are in the center of the photo and the possible sluice-gate depression is beyond. The strange protrusion of limestone blocks at the base of the wall is seen here from above, already smeared over on top by modern cement. (Photo by Robert Temple)





Figure 6.38 A closer view of the apparent bolt slot and sluice-gate slot in the base of the northwestern corner of the Valley Temple. Modern cement is smeared into the base wall here, running from the top of the second step along the photo, as part of a clumsy restoration of the structure. (Photo by Robert Temple)

The water-erosion features of this wall are now a thing of the past, and I believe that my photos of them may be the only ones in existence, due to the fact that this area has been sealed off from visitors for the best part of living memory. Certainly the interpretation that I would give to my set of photos is that they suggest that a body of standing water sat in the channel for centuries, sometimes higher and sometimes lower, and as it led toward the Sphinx Moat, it was the channel by which the water in that moat was regulated during the Old Kingdom. We have to remember that these features were buried under sand during the New Kingdom and were only cleared in 1936 for the first time in approximately four thousand years. Therefore, all these strange carved and drilled features in the stone must date from some time prior to 2000 BC.

The water erosion certainly has not occurred since 1936, so it must therefore have occurred in the Old Kingdom, during the period circa 2500–2200 BC. This photographic and physical evidence should therefore be accepted until such time as anyone can produce any alternative explanation for it. Personally, I have to admit that my powers of imagination cannot summon up any alternative but to accept that Nile water stood here, was let in and out here, and from here was carried through to the Sphinx Moat. Some of the curious niches, indentations, and holes in the rock and stone seen at this location may have been connected with the operation of the water-raising equipment, counterweights for raising and lowering devices, sluice gates, and other details of the managing of the water. Certainly there must have been some purpose associated with these many anomalies, some of which were definitely carved out of the stone and rock with great care in Old Kingdom times. Alas, most of these also must have been covered up now by the restoration stones, and not only are my photos probably the only record of them, but I was not in time to photograph them all, as the restoration was well under way. There is no record at all of the others that must have existed. Even before the restoration stones were applied, modern stone had earlier been inserted into some gaps and cement had been pushed into holes to render them level and smooth, as my photos also show. There is thus no photographic record of the pristine evidence in its entirety.

At the very point where the channel between the two temples spills directly into the Sphinx Moat, a clear swirling pattern in the rock is visible, as recorded in my photos in figures 6.37, 6.39, and 6.40, which seems to indicate repeated rushing of water from the channel into the moat when a sluice was raised. The water must therefore have been raised into the narrow channel, and when it had reached a certain level, a sluice was lifted so that the water thus raised could pour into the moat. A full engineering

study of all these possibilities should be undertaken by hydraulic engineers. To study the subject properly, they should build a scale model of the moat and inlet, calculate the variations of the hydraulic pressures and flows due to the reduction in scale (of the model), and then calculate and plot the hydraulic phenomena. This should then be illustrated by computer graphics showing the water in motion. This would make a very good project for the new Cairo Archaeological Museum at Giza, to demonstrate to tourists how the Sphinx Moat worked in its original state as an ingenious example of ancient hydraulic engineering.



Figure 6.39. This view shows the swirling pattern in the rock where the water entered from the channel and then passed to the right into the open Sphinx Moat. The horizontal lines in the Sphinx Moat wall beyond the iron gate show how the standing water ate away at the softer veins in the natural limestone, this created the successive indentations, which are approximately horizontal to the bedrock. It is important to stress that they are not waterlines as such, but are erosion lines in the softer veins caused by the water. The veins are not precisely parallel to the bedrock surface because the limestone table is slightly tilted downward to the east. (Photo by Robert Temple)



Figure 6.40. Only if one is given special access to the Sphinx and Valley Temples can one get this view of the continuation of the Sphinx Pit around its southeast corner, where the continuity of the water erosion patterns is clearly visible. The Sphinx Pit leads up and to the right beyond the metal gate. (The base of the Pyramid of Chephren is at top right.) Around this corner and behind the photographer, a channel leads down between the two temples, different aspects of which are shown in the succession of plates documenting these features, some of which have subsequently been covered over by restoration work. I do not believe any other set of photos of these crucial features has ever been taken. (Photo by Robert Temple)

I have looked carefully through the published excavation accounts of Selim Hassan from the 1930s. He is the man who finally cleared the entire Sphinx Pit, which he called the Sphinx Amphitheater, down to the bedrock. I wanted to discover whether there was any evidence that he had encountered a mud-brick

wall on the east side of the moat that might have retained the moat water as an additional barrier placed westward of the Sphinx Temple's west wall. He certainly cleared many mud-brick structures and walls from the Sphinx Pit! But my attempts to discover specific evidence on the east side met with frustration because so much work had been done there by his predecessors, most of which was undocumented, in the careless and lazy way archaeologists had in those days. The east end of the Sphinx Pit in front of the Sphinx was largely cleared by Caviglia in 1817 (but the sand returned), partially by Mariette in 1853, partially by Maspero in 1886, again by Baraize in the 1920s, and finally by Hassan in the 1930s. However, Hassan expressed a great deal of frustration at a wall that Baraize had actually himself constructed in front of the Sphinx, and which Hassan had to demolish before he could proceed. Hassan writes: "We commenced our season's work on October 4, 1936, at a spot lying close to the northern and eastern walls which M. Baraize had built, and which we were forced to demolish before we could get down to our task of excavating."<sup>13</sup>

He adds further:

In 1925 M. Baraize was entrusted by the Antiquities Department to carry out excavations there [at the Sphinx] on their behalf. M. Baraize certainly freed the statue from all sides, but instead of clearing the sand away altogether, he erected huge barrage-like walls to hold it back, the demolition of which was one of our most laborious tasks when it became necessary to remove them in 1936–1937. I believe M. Baraize had taken his inspiration from the monuments of the Old Kingdom and built for eternity.<sup>14</sup>

The photo of the eastern wall built by Baraize in front of the Sphinx and published by Hassan (reproduced here as figure 6.43) shows a massive structure resembling a fortress, as if Baraize were expecting an attack on the Sphinx from the east by a heavy artillery division.<sup>15</sup>



Figure 6.41. This is the strange cubicle and base carved out of the bedrock at the northwestern corner of the Valley Temple. The base of the temple itself is a continuation of the same bedrock. See figure 6.42 for further detail. (Photo by Robert Temple)



Figure 6.42. Detail of the cubicle and step at the base of the northwestern corner of the Valley Temple. The electricians for the *son et lumière* show have laid their cables across it. The two granite pieces roughly jammed in recent years onto the top, in front of modern masonry, rest upon the original initial step downward from the end of the causeway, which constitutes the top of this cubicle. It is clear from this first step that this corner cubicle was a way to go down, either into water or onto steps that led into the passage between the two temples. Such a narrow and obscure descent as this can have been intended only for very restricted access (not unlike that of today!) and certainly would have been inadequate for a procession. This descent was not noticed or mentioned by the excavator Uvo Hölscher in the only book ever published about the Valley Temple, a book I know intimately, since I have co-translated most of it from the German. Nor was it noticed or mentioned by Selim Hassan or Herbert Ricke in their books on the Sphinx and the Sphinx Temple. In fact, no one seems ever to have noticed it before! Can this have been the mooring point for a small boat that made its way around the corner and into the Sphinx Moat? (Photo by Robert Temple)



Figure 6.43. Selim Hassan published this photo in his own excavation report to show the "huge barrage-like walls" built in 1926 by Baraize to hold back the sand so that it did not reengulf the Sphinx. The massive constructions are shown in the upper half of the photo. Hassan and his team had the unenviable task of getting rid of these walls. Often it is more difficult to clear away modern structures than ancient ones! (From *Excavations at Giza, 1936–1937, volume VIII*)



The pity is that Baraize's monstrous wall was built on top of the very place where an ancient mud-brick wall would have had to stand to retain water in the Sphinx Moat. In constructing his own wall, and leveling the foundation for it, Baraize would inevitably have destroyed all trace of any ancient mud-brick wall. If anything had survived, it would then have been cleared by Hassan when he got rid of Baraize's wall, for Baraize's wall was too solid and vast to be removed delicately, and an actual assault on it was necessary! So we see that five modern excavators have had a go at the point where the east wall of any moat would have stood. One of them built heavily upon it and the others relentlessly cleared everything to bedrock. No chance of any traces surviving all that! But even in ancient times, activity on that spot was intense. The area was open to the public during Ptolemaic and Roman times, having been entirely cleared by them; this area was the forecourt for the worship of the Sphinx as an idol. The great steps descending to the Sphinx directly over this spot may be seen in figures 6.44 to 6.48. Of the steps, Charles Irby, who visited the Sphinx at the time of the Caviglia excavations and knew Henry Salt, quotes what Salt said to him about the impact they were supposed to make on ancient visitors:

I must beg you [the reader] to imagine yourself fronting the face of the sphinx, at a considerable distance, and nearly on a level with the lower part of the face, and also with the ground adjoining the animal [he refers to the mountains of sand on all sides that have now been cleared away]. As you advance, you find at some distance from the paws, a flight of steps which lead some depth below the paws to the base of the temple [he means the space with the altar, then called "the temple," as the Sphinx Temple itself was still unknown]. Mr. Salt is of opinion that this descent by steps was meant to impress the beholder (after having first viewed the sphinx at a distance on a level) with a more imposing idea of its grandeur, when he views the beast in its full magnitude from below.<sup>16</sup>

And even before Ptolemaic and Roman times, the area was cleared by the New Kingdom pharaoh Thutmosis IV when he erected his Dream Stela between the Sphinx's paws (see figure 3.3). So over the past 3,400 years, there have been at least seven serious attempts to clear the area east of the Sphinx, where any extra retaining wall for a moat would have stood in the Old Kingdom period.

The irony of all this is that it was Selim Hassan who in 1936 finally cleared the Sphinx Temple, which was farther east. Its existence was unknown even in the New Kingdom, when it was totally buried in sand and forgotten. This subject is discussed more fully in *Egyptian Dawn*, which includes an account of important discoveries made by myself and a colleague within the Sphinx Temple, to which we were given special access by the Egyptian Supreme Council of Antiquities.

Another crucial fact about the Sphinx Moat is that from the earliest times in the Old Kingdom, much of the rainwater from the east slope of the Giza Plateau was fed into it by a prominent drainage channel. This is remarkable evidence in favor of the existence of a moat being recharged with as much as possible of the rainwater and flash-flood water from the occasional downpours that even today Giza experiences once in a while, and that were more common in Old Kingdom times, when the climate was milder. The existence of this drain has been constantly mentioned by Zahi Hawass in recent years in the context of his friendly dispute with Rainer Stadelmann as to who carved the Sphinx, Pharaoh Cheops or Pharaoh Chephren.



Figure 6.44 This is the only surviving image that shows us the full grandeur of the gigantic stairway leading down to the Sphinx in Roman times to enable the public to come and worship the Sphinx as an idol, and pray to it and make offerings. This drawing, by Henry Salt, shows us the view as seen from the Sphinx itself, with Cairo invisible in the distant background, and the Mokkatam Hills beyond it at the horizon. This drawing was made in 1817, when Caviglia was clearing the Sphinx (men carrying away sand in baskets on their heads are at right). The Sphinx Temple was still unknown at this time and is actually underneath the stairway. The large rectangular mound at the right of the stairway, covered in a hill of sand, covers the right half of the Sphinx Temple (as still seen in figure 6.50, the aerial photo taken in 1926) and the Valley Temple, the latter of which was more or less known to be some kind of covered ancient structure but was not excavated or explored yet. The entire stairway seen here was demolished, and not a stone of it remains, because of the need to excavate the Sphinx Temple beneath. Although it cannot be seen clearly here, to the left of this stairway in this view, along its northern edge at the front, the stairway did not continue to the cliff face, but there was a horizontal passage leading to something underneath, possibly a passage heading northward and descending to a small subterranean chamber. This was never explored. In figure 6.47, which is a ground plan of the stairs and paws of the Sphinx as measured and drawn by Henry Salt, this horizontal side passage is clearly shown, culminating in a left turn marked by Salt "supposed door" and leading to an unknown destination. Since Salt measured the location of this door so carefully, it should be possible to identify that location precisely today by doing measurements on the ground. No one has ever done this, but it is clear that the location is above the northwest corner of the Sphinx Temple, and it may mean that one small section of that structure was known and reached by a shaft at this time. This accords with the findings of myself and my colleague Professor Ioannis Lirtzis, in our official dating investigation of the Sphinx Temple, that a small section of the Sphinx Temple just inside the eastern wall was accessible by shaft during late times. Thus, two small ancient exploratory shafts seem to have reached the Sphinx Temple many centuries after its burial by sand around 2000 BC, resulting in intruded material at one location, though the one we investigated was extremely small and restricted to a tiny area, and the one suggested by Salt's drawings was probably similar. Precise measurements on the ground could give us the location for Salt's "supposed door," and then it would be possible to identify which tiny section of the subterranean structure may have been accessible to the Ptolemies and the Romans and perhaps used as a chamber or crypt in connection with Sphinx ceremonies. This drawing comes from *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Perring, London, 1842, third appendix volume, plate opposite page 113 (Collection of Robert Temple)



Figure 6.45. A photo of the Roman steps leading down to the Sphinx (which is behind the camera), taken prior to 1936 and published by Herbert Ricke in *Der Harmachistempel des Chefreden in Gizeh (The Harmachis Temple of Chephren at Giza)*, in *Beiträge zur Ägyptischen Bauforschung und Altertumskunde*, ed. by Herbert Ricke, volume 10, Wiesbaden, 1970. The main steps are on the right. Behind and beneath the minor flight of steps on the left was a passage that was never fully explored. All these steps are now entirely demolished.

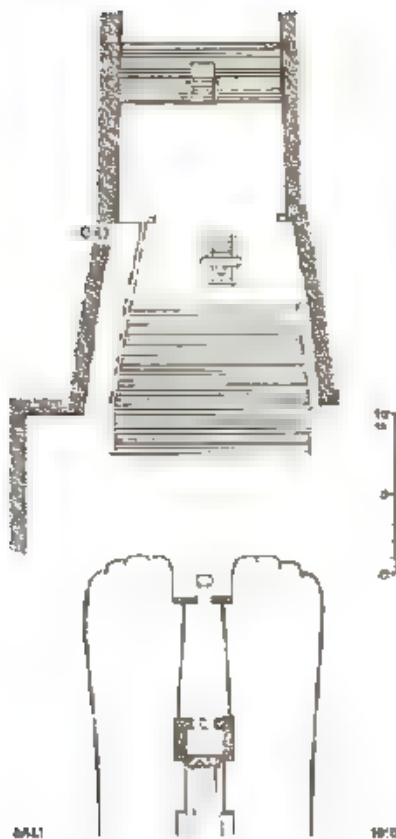


Figure 6.46. After the broad Roman steps down to the Sphinx from the east had been removed (see figures 6.44 and 6.45), these older steps were found underneath. Uncredited photo reproduced in Herbert Ricke's *Der Harmachistempel* (1972), plate 4b. These too have been removed, and no trace remains of any of the steps.



Figure 6.47. This is Henry Salt's carefully measured ground plan drawing of the front paws of the Sphinx (at right) with the altar and stelae between them, facing the now vanished stairway leading down to the Sphinx and dating from Roman times. Salt's view of this stairway, with my extensive caption explaining it, is shown in figure 6.44. The stairway was dismantled and demolished entirely when the Sphinx Temple beneath it was excavated, and not a stone of it now remains. The sections of stairs were separated by platforms containing altars, which explains the curious rectangular structures in the plan. At the bottom of this plan's drawing of the stairs, along the north edge of the bottom of those stairs, was an indented horizontal passage (marked "N") leading to a "supposed doorway" heading north, which was never explored. This probably led to a ladder or small stairway leading to a crypt excavated by a narrow shaft in the northwest corner of the Sphinx Temple, where a chamber may have been used by officiants of ceremonies connected with the worship of the Sphinx at this time.

My colleague Professor Ioannis Liritzis and I discovered a similar small area elsewhere in the Sphinx Temple against the interior of the eastern wall, which had been penetrated by a later shaft, where intruded material had been left. There is no doubt, however, that the existence of the Sphinx Temple as a structure remained unknown in antiquity after 2000 BC, despite these two apparent shafts reaching tiny portions of it, which must have appeared to be remnants of tombs and were not comprehended as being parts of a temple. (I do not believe the one we found was still accessible by the time of the Ptolemies and the Romans.) This drawing is found in *Operations Carried On at the Pyramids of Gizeh in 1837* by Colonel Howard Vyse and John S. Perring, London, 1842, third appendix volume, plate opposite page 110 (*Collection of Robert Temple*).



Abh. 1  
Plan der römischen Treppe, von SALT 1818

Figure 6 48. The plan of the descent of the Roman steps toward the Sphinx, whose front paws are at the bottom of the picture. This is the plan as published by Herbert Ricke, who took it from Henry Salt's drawing as published in 1818. Directly beneath the Roman steps was the still undiscovered Sphinx Temple. At left, there is a small opening, and the German word *Tor* followed by a question mark; *tor* means "door."



Figure 6 49. This is the corner inside the eastern end of the Sphinx Temple where an intruded shaft led down to the floor level. The dating results obtained by my colleague Professor Ioannis Liritzis confirmed that this location had been reached by a late intruded shaft. The Sphinx Temple is discussed at length in my book *Egyptian Dawn*. (Photo by Robert Temple)





Figure 6.50. This is an aerial photo of the Sphinx taken by the British Royal Air Force on September 28, 1926 (as we know from the information on the back) This image has never been published as far as I know This is probably the best photographic evidence to survive of the gigantic barrage walls constructed by Baraize earlier in this same year to hold back the engulfing sand As can be seen here, his major effort was to prevent the sand from pouring in from the north (on the right in this photo) and the east (the foreground in this photo), since the southern portion of the Sphinx Pit had been completely cleared by him and the portion of the Chephren Causeway beside it had also been cleared It is remarkable that at this late date, the remainder of the Chephren Causeway was completely covered by sand and was invisible. This photo provides graphic evidence that the Sphinx Temple in front of the Sphinx was still completely unknown, covered in a vast hill of sand Above and behind the Sphinx Pit, which has been cleared to the bedrock at the back, Baraize has erected strong walls to stop the sand pouring in from the west. All these overwhelming penins of sand were not eliminated until 1936, when Selim Hassan, with hundreds of laborers and railway tracks (see figures 3.11 and 3.12) finally carried it all away in one of the most Herculean clearance efforts in the history of world archaeology. At that time, in clearing the mountain of sand seen here in the foreground, he discovered and cleared the Sphinx Temple underneath, which had been lost beneath the sand and forgotten no later than 2000 BC (which was the end of the Old Kingdom period). This is one of the most historically important photos ever taken of the Sphinx, and I bought it from a dealer for only £2 99 Sometimes in life one gets a bargain. (*Collection of Robert Temple*)

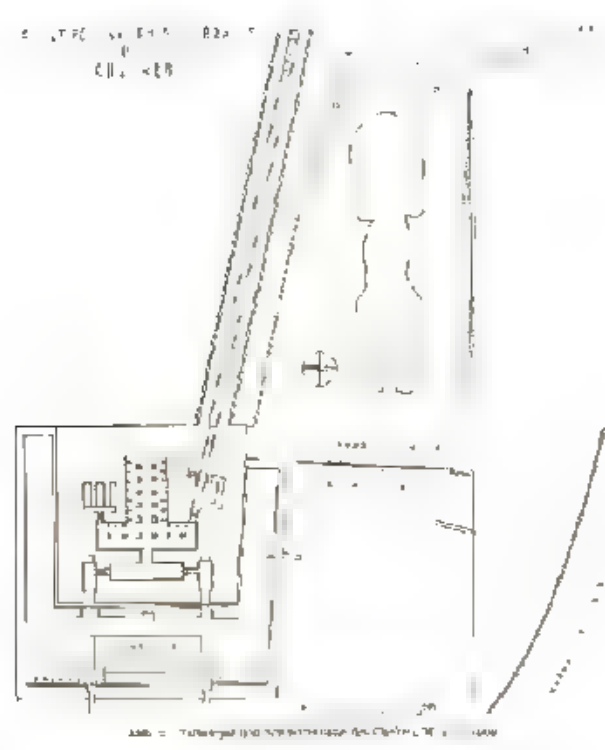


Figure 6.51. "Before." This drawing shows the Sphinx and the Valley Temple as they were known prior to 1936, and the excavation by Selim Hassan that revealed the entire Sphinx Temple in the empty space shown here in front of the Sphinx, which had been covered by a mountain of sand for four thousand years Compare with figure 6.52 adjoining, which shows the view "After" This drawing is figure 2 on page 5 of Herbert Ricke's *Der Harmachistempel des Chephren in Giseh*, Wiesbaden, 1972.

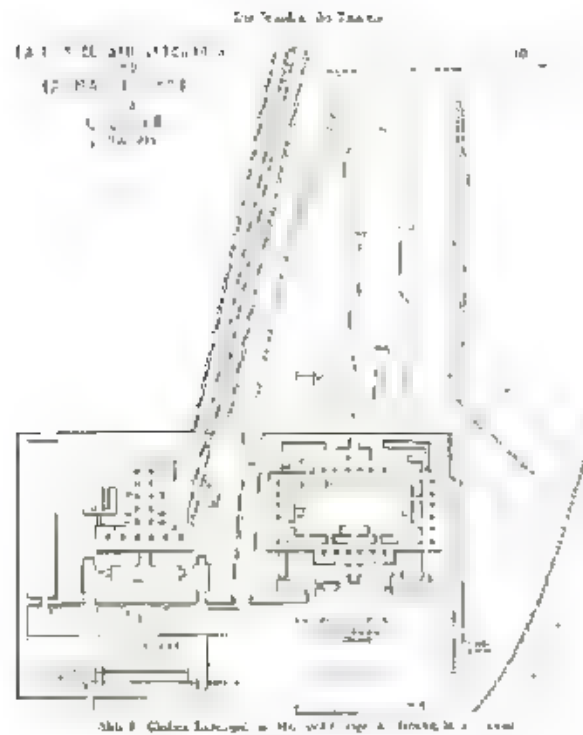


Figure 6.52 "After" This drawing shows the Sphinx with the Sphinx Temple in front of it, as excavated in 1936 and unknown prior to that. This drawing is figure 8 on page 19 in Herbert Ricke's book *Der Harmachistempel*

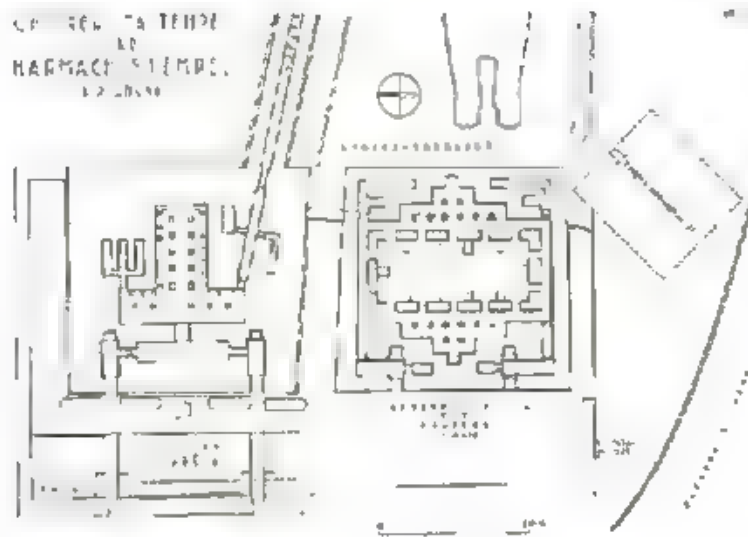


Figure 6.53. This plan from Herbert Ricke's excavation report (in German) of the Sphinx Temple (which he calls the Harmachis Temple) shows very clearly the bedrock barrier at the top of the North Trench, at the right of the Sphinx Temple (seen in figure 6.21). It also gives an accurate location for the small New Kingdom Temple of Amenhotep II, seen in figures 7.3 to 7.5. Although that small temple gives the superficial appearance of having been plunked down more or less at random, in reality it was placed in visual relation to the Great Pyramid, as demonstrated by the photo in figure 7.3. The paws of the Sphinx are at top right. The building on the left is the Valley Temple, and the structures shown in front of it are its quays. The quays of the Sphinx Temple, visible in the old photo in figure 4.2, have been covered over again with sand, and Ricke was unable to draw them because his excavations did not extend that far. *Taltempel* is the German word for Valley Temple. By *Sphinx-Terrasse*, Ricke means the Sphinx Pit, which he calls a terrace.

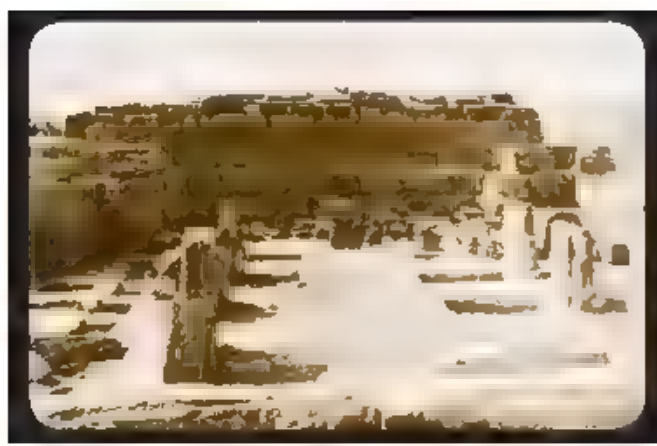


Figure 6.54. The central court of the Sphinx Temple, seen from the north and looking directly south. The north wall of the Valley Temple rises beyond in the background. Reproduced from Herbert Ricke, *Der Harmachistempel*, Wiesbaden, 1970, in which it is plate 14a.



Figure 6.55. A view of the southeast corner of the Sphinx Temple as seen from the roof of the Valley Temple. Along the bottom of the photo, in deep shade, is the conduit for the water that led into the Sphinx Moat (toward the left) from the Nile inundation floods that would have reached to the place where the people are walking. (Photo by Robert Temple)



Figure 6.56. This photo, which I took inside the Sphinx Temple, shows two granite blocks (the slightly pink blocks lying on the bedrock) lying loose and abandoned. Left perhaps from some lost part of the structure. The two blocks are far from any obvious construction made of granite. There is no ready explanation for their presence in the midst of this limestone edifice. The one in front was presumably left there subsequent to Selim Hassan's excavation. Ricke does not comment on these anomalous blocks, although he carried out subsequent excavations at this site. The Giza structures have many such anomalies and few convincing

As I described earlier in this book, at the 2000 Congress of Egyptologists in Cairo, Stadelmann was giving his paper about the Sphinx having been carved by Cheops (we have already seen in chapter 4 that Stadelmann dismissed the possibility that the face of the Sphinx could possibly be Chephren's), when Hawass got up from the audience, took the microphone from Stadelmann, and said it was impossible that the Sphinx could have been carved by Cheops. Hawass pointed out that there was a prominent rainwater drain connected with the Chephren Causeway that emptied directly into the Sphinx Pit. The implication was that Chephren would never have constructed such a drain and allowed rainwater to pour into the Sphinx Pit if Cheops had already dug out the pit and carved the Sphinx. It would have been too impolite and an insult to allow wastewater to desecrate the site. Therefore, the Sphinx cannot possibly have been carved before the time of Chephren. Of course, that leaves the embarrassing question of why Chephren would want to desecrate his own site! But presumably it would be more polite to do that than to desecrate an existing site, and it would be his own business.

The drainage channel leading into the Sphinx Moat is about 6 feet wide and 4.5 feet deep, so it was a major construction intended to bring considerable amounts of water down into the moat. It was eventually blocked at some later stage by pieces of granite. It is described by Paul Jordan (who prefers to call Chephren by his Egyptian name of Khafre) as follows:

The Khafre causeway was equipped with drainage channels which are interesting to us now because they indicate that rainwater run-off was an essential provision of the pyramid complex. We are accustomed to think of Egypt as a very dry place, but even today, in times that are drier still than were the days of the Old Kingdom, rains can sometimes come and cause considerable damage in a context where they are not routinely expected. Evidently the monuments of the Giza necropolis needed precautions against rain. On the north side of the Khafre causeway, there is a ditch (2 m. wide and 1.5 m. deep) that forms a demarcation line between the pyramid complexes of Khufu [Cheops] and Khafre. This rock-cut ditch was large enough to channel a great deal of rainwater when heavy rains occurred. It is cut into by the corner of the Sphinx enclosure, and—were it not blocked at this point with pieces of granite—would allow water to pour in quantity into the basin out of which the Sphinx body was carved.<sup>17</sup>

Jordan does not mention that if rainwater still poured down the plateau today at the rate it obviously did in the past, the blockage by the pieces of granite would cause a real mess, with the water being diverted all over the place. The drain was probably blocked either during the New Kingdom or during Ptolemaic/Roman times, at both of which eras the Sphinx Moat was open and needed to be kept dry for religious observances at the feet of the statue. By these times, the climate must already have become considerably drier. It is obvious that the granite blocks are not original, since no one would build a long channel all the way down the side of the causeway (which is made of limestone blocks) only to render it ineffective for its purpose at the very end, causing all the work of its construction to be wasted. At some later date, somebody wanted to stop the water pouring into the moat, whereas originally the purpose to divert water from the plateau into the moat is entirely obvious.

Far from being of importance only in the Cheops-versus-Chephren controversy (which may be irrelevant anyway), the rainwater drain that leads directly into the Sphinx Moat makes it clear that from at least the time of Chephren in the Fourth Dynasty, the recharging of the moat with as much fresh water as possible was considered to be such a high priority that vast trouble and expense were lavished on the



construction of a long stone drain leading into it from high up on the Giza Plateau. It seems not so much an act of desecration of a monument as a technique for keeping the moat full, draining into the moat whatever rainwater might be available during the period of the year when the Nile inundation had receded.

And this brings us to the subject of the upkeep of the moat generally, which will in turn explain much that is strange about the apparent signs of severe water erosion in the Sphinx Moat, many of which are vertical. If we look at my photo in figures 6.57 and 6.58, we can see these vertical fissures that appear to have been scoured out of the rock walls of the Sphinx pit by water cascading downward. It is not strange that West, Bauval, and Hancock have drawn the conclusion that these vertical scourings must have been caused by vast torrents of rain pouring down the slopes in remote antiquity when there was supposed to have been a rainy environment in Egypt, prior to 10,000 BC. (This rainy environment may or may not have existed and is disputed.) After all, what else could have caused them?

Let us think about the problems of maintaining a sphinx moat. There you are with your huge moat on the edge of the desert, and what are your problems going to be? What was it that happened so repeatedly to the Sphinx over the millennia? It was always getting covered with sand. And that is the problem for your moat! Sand! (Technically speaking, *sand* is only a casual term, what you find at Giza is really fine desert dust rather than the coarse sand grains that are familiar to us from beaches.) So what do you have to do, over and over again? You have to *dredge the moat*. And to do that, you are continually dredging at the sides, hauling up the sand from the bottom of the moat and letting all the excess water pour back into the moat in powerful torrents. You are, in fact, creating artificially and in intensive form the same coursing of water down the sides of the moat that is postulated for the “ancient rain” theory. But you don’t need rain, you need only sand, because the sand blowing into the moat with the wind is sufficient cause to motivate your dredging and your scouring of the sides of the pit with descending cascades of water, over and over again until the rock is gouged out in just the way that we see now.

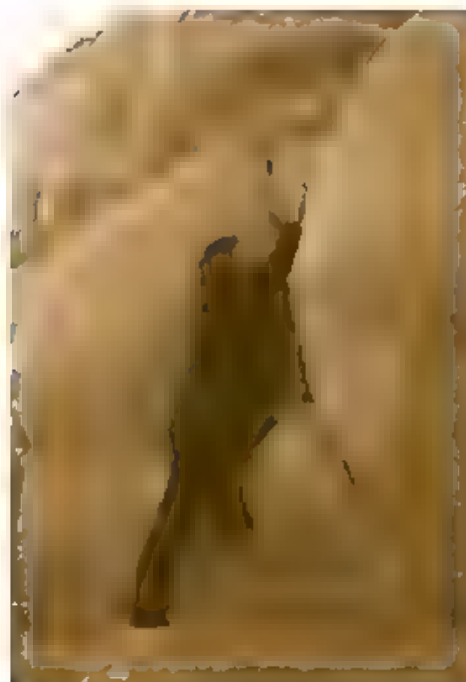


Figure 6.57 Olivia climbing up the vertical crevasse in the south wall of the Sphinx Pit, which I believe was gouged by centuries' worth of water pouring down from dredging operations in the continual battle to dredge the windblown sand out of the Sphinx Moat during Old Kingdom times (See the crevasses also in figure 6.58 below) (Photo by Robert Temple)



Figure 6 58. To the left is the rear of the Sphinx, in the center is the Sphinx Moat on the southern side, and to the right is the southern cliff wall of the Sphinx Moat. The horizontal erosion along the sides of the cliff in the veins where the limestone was weaker was caused by water lying in the moat for centuries during the Old Kingdom. The separate vertical erosion would have been caused by water pouring down the sides during the process of dredging the windblown sand out of the moat on countless occasions over the same period. (Photo by Robert Temple)

You don't need those extra seven thousand years, you don't need Atlantis, you don't need theories about prehistoric climate changes: all you need is sand blowing in the wind, a ditch full of water, and some men with some basic dredging equipment.

Now we can appreciate also the differing patterns of erosion. The vertical fissures in the sides of the Sphinx Moat are from water coursing downward both from dredging and, of course, from rainwater and flash-flood water. (Flash floods may seem anomalous to people who have visited only briefly as tourists, but they are common in Egypt, and in the Valley of the Kings many tombs such as that of Rameses II have largely been destroyed by them. The Old Kingdom dam at Wadi Garawi, east of the Nile, which I have studied intensively and which I will discuss in a future book, was destroyed by an enormous flash flood, and that gigantic dam was of truly enormous strength and bulk.) But there are other patterns: we have already seen that there was standing water in the passage between the Sphinx and Valley Temples, which was of course horizontal. And on the body of the Sphinx itself, there are no great vertical scourings such as there are on the walls of the pit, but rather there are horizontal patterns of erosion, as one would expect on a giant statue sitting in the middle of a moat and constituting an island. The chest and sides of the Sphinx are so prominently scoured horizontally with what appear to be multiple water levels (see figures 2.16, 2.19, 2.25, 2.26, and 2.29 to 2.31), like those along the base of the Valley Temple's north wall, that I am frankly amazed that no one has ever previously pointed out that the statue seems to have sat for long periods in water whose level varied. These horizontal streaks, where the stone has so clearly been eroded in a perfectly horizontal manner (which cannot be as a result of wind!) at multiple levels, are some of the most prominent features of the Sphinx. But even the ancient-rain theorists have never called attention to these patterns. Geologist Robert Schoch published a book entitled *Voices of the Rocks* in 1999 supporting John Anthony West's thesis. This book contains a disappointing chapter about Schoch's study of the Sphinx. In it, he actually says that "vertical crevices" are "well developed and prominent on the body of the Sphinx and within the Sphinx enclosure."<sup>18</sup> Certainly they are prominent on the walls of the Sphinx Moat, but not on the body of the Sphinx, which is marked instead by *horizontal* crevices so prominent that they cry out for attention. Schoch, however, does not mention these features at all! His book lacks sufficient references. It is a pity, because he does have some interesting ideas, and I agree with him about some things. For instance, he is convinced that the head of the Sphinx has been recarved:

From the first time I saw the Great Sphinx, and particularly after I was allowed to inspect the head firsthand and up close, I have been convinced that the Sphinx's current head isn't the original. Relatively recent tool and chisel marks, as well as the appearance of the stone itself, indicate that the current head is a recarving from an original (which may have represented an animal rather than a human). This recarving hypothesis also helps explain the head's obviously small size in relation to the body, a disruption of proportion unusual in Egyptian monuments <sup>19</sup>

I certainly agree with all this most heartily, though Schoch then suggests that the head is that of Pharaoh Khafre (Chephren), which it does not resemble in any way, as we have already seen. But Schoch also correctly criticizes a particularly silly passage about the Sphinx by the Egyptologist Mark Lehner, "who used a computer program to reconstruct the appearance of the undamaged Sphinx and felt that the face 'came alive' when he gave it Khafre's features. In other words, when Lehner made the Sphinx look the way he thought it should, then it looked the way he thought it should. Such reasoning is, of course, circular."<sup>20</sup> And this is not the only folly of Mark Lehner's, for his insistence that a straight line can be drawn joining the southeast corners of the three main pyramids of Giza is demonstrably false, as anyone standing at the southeast corner of the Great Pyramid and looking back at the others can instantly see. Lehner's bizarre drawing of this phantom line may be found in his book *The Complete Pyramids*,<sup>21</sup> where a "back sight" is drawn, as if a conclusive observation had been made with a theodolite. In his comments, Lehner calls this "the Giza diagonal line."<sup>22</sup> I do urge anyone who visits Giza to go and stand at the southeast corner of the Great Pyramid and look back at the smallest of the three pyramids, the Mycerinus (Menkaure) Pyramid. He will see that the southeast corner of the Chephren (Khafre) Pyramid is significantly set back and does not fall on this alignment at all "The Giza diagonal line" does not exist! It does not exist any more than the face of Chephren on the Sphinx exists.

Another interesting revelation in Schoch's book is that an Egyptologist from Chicago, Frank J. Yurco, has the same idea that I have about the Sphinx having sat in a moat, although we formulated our ideas separately, and I have never read anything of Yurco's or even seen any publication of his. Schoch disputes Yurco's ideas, although he does grant that the Nile water would have reached the Sphinx "at least on occasion."<sup>23</sup> One reason he advances for dismissing the idea of a Sphinx Moat is that there would be "greater wear" on the paws than is found. But that is an entirely unconvincing statement, for the paws are well known to be wholly covered in reconstruction blocks and were rebuilt in this way in Roman times for the obvious reason that they were so extraordinarily worn away! Schoch does not give any references to Yurco's publications, which is unfortunate, so I have never been able to find them or to consult them.

There is one other major point in Schoch's book that should be mentioned. He says that he determined through his geological investigations of the Sphinx Pit that there was deeper erosion to the north, south, and east of the Sphinx in the floor of the moat than there is to the west.<sup>24</sup> This discovery substantiates the hypothesis of a moat fed from the east by the Nile. The west end of the Sphinx Moat on the side of the pyramids would have been spared the onrush of the incoming waters and would have eroded less, since the Sphinx itself would have acted as a barrier to protect that end of the moat from water surging in. Also, as the water would have been far more stagnant at that dead end of the moat, sand blowing into the moat would have been less stirred up and would have tended to remain stationary there, thus providing a surface cover. Dredging could never have removed all the sand from the moat, and some would always have settled back. The sand falling back into the west end would have been "dead," in the sense of never moving or shifting around. The wash from the incoming water as it came in from the east would swish extra sand toward the back, western end, where it would tend to collect to a greater depth than elsewhere,



and thus the sand there would always have been much deeper than in the north, south, and east portions of the moat. Bottom erosion would therefore *have to be* less at the west end of the moat. Schoch's discovery thus provides a major geological support for the Sphinx Moat hypothesis.

The two differing patterns of apparent water erosion in the Sphinx Moat are thus found in the two different places where one would expect them and differ in the ways that one would also expect. If we had huge vertical scourings on the Sphinx itself such as we have on the walls of its moat, there would be a problem. But everything accords with the simple explanation that in Old Kingdom times the Sphinx was an island sitting in the middle of a moat with its back and head sticking out of the water. This can explain the ancient reference in the previous chapter to the body of Anubis at Giza being "concealed" as he lies in his crouching position. We might also find echoes of this situation in Utterance 213 of the Pyramid Texts, where we are told: "Your arms are Atum, your shoulders are Atum, your belly is Atum, your back is Atum, your hinder-parts are Atum, your legs are Atum, your face is Anubis."<sup>25</sup>

Atum was the creator god of the Egyptians, who emerged from the watery abyss and chaos of the primeval waters as an island. He manifested himself as an "Island of Fire" in the midst of the water on the occasion of the first sunrise and "emerges from the Akhet [horizon]."<sup>26</sup> This accords with the facts that the Sphinx faces due east on the equinox, facing the sunrise, and that the later name of the Sphinx was Horemakhet, or Horus-of-the-Horizon, and was thus associated with the *akhet*, or horizon, that was first manifested in the initial sunrise of the creator god himself. (A great deal more discussion of this subject is found in the next two chapters.) The crouching guardian of the necropolis, Anubis, thus also represented Atum, and faced the sunrise of the first creation, manifesting himself as the primeval Island of Fire in the midst of the Lake of Fire, of which we hear so much in the Pyramid and Coffin Texts as a central feature of the netherworld.

We have definite proof that the Sphinx was associated with Atum from the Dream Stela, which gives the name of the Sphinx in New Kingdom times as Hor-em-akhet-Kheperi-Ra-Atum. (Hor-em-akhet means Horus-in-the-Horizon, referring to the eastern horizon of sunrise. Kheperi is the name of the rising sun, portrayed as a scarab beetle, and Ra is the name of the sun god in general.) Furthermore, in the *Book of the Dead*, Atum is specifically called "the Master of the Lake" (chapter 3, line 2).

Having considered the work of Robert Schoch, we must now take note of the far more elaborate studies of the Sphinx geology by Lal Gauri, who is coauthor of a definitive book entitled *Carbonate Stone*,<sup>27</sup> of which limestone is, of course, the main kind. He is an emeritus professor of an American university at which I was also an adjunct (part-time "visiting") professor from 1999 to 2002. In 1995, Lal and two colleagues published an article in the journal *Geoarchaeology* rebutting the ideas of West and Schoch about a Sphinx going back far beyond the Old Kingdom times in Egypt. The article was entitled "Geologic Weathering and Its Implications on the Age of the Sphinx."<sup>28</sup> Lal and his colleagues pointed out that the assertion by West and Schoch that the weathering of the Sphinx and its pit was extremely ancient was groundless, and that there was no need for frequent and heavy rain to have caused the erosion that we see. However, excluding rain is not the same as excluding water! (Everyone admits *some* rain, but not enough.) They then explain complex details of how erosion takes place in limestone rocks, concerning microscopic pores and so on. Dew (still common at Giza) enters into these at night, temperature differentials work away at the delicate stone, and it flakes and erodes. These processes are still taking place today, as they clearly demonstrate. They also point out that the Giza Plateau is riddled with small caves caused by water flowing through the rock over geologic eons, and then when the Sphinx Pit was excavated, many of these were exposed and the patterns caused by water erosion revealed, having been there all the time underneath the surface. As they put it in conclusion: "The deep channels in the walls of



the Sphinx ditch, which [West and Schoch] consider as having been formed by the running water [of “ancient rain”], are actually caves, formed by the underground water in geologic antiquity.”<sup>29</sup>

There is no doubt that this is true. But being true is one thing and being the whole truth is another. Lal and his colleagues acknowledge that further erosion of these exposed underground watercourses and caves then took place. But they think this was caused entirely by dew. My proposal in this context is simple: there was plenty more water vapor at hand for these microscopic erosion processes that arose from the Sphinx Moat, and furthermore, there were the vertical scouring effects of the dredging, as I have explained, and the horizontal processes of the varying moat level itself, which rose and fell from time to time over the course of the centuries of the Old Kingdom during which it existed.

Lal and a colleague give a more elaborate account of the Sphinx issue in the book *Carbonate Stone*, which appeared four years later, in 1999. In this book, much more detail and many more illustrations are available. It is, in fact, a classic source that anyone interested in this subject must consult. I shall not attempt to summarize the complex material presented in *Carbonate Stone*, much of which is concerned with the highly technical details of pore size in the rock and what the implications of this are for erosion and durability. Lal was, after all, part of the team who worked (together with Mark Lehner and Zahi Hawass) on the great Sphinx Conservation Project. In this book Lal and his colleague repeat:

The evidence used by the authors of the new theory [West and Schoch’s “ancient rain” theory] is based upon interpretation of geomorphological features and seismic data. We show in this chapter that deep channels in the walls of the Sphinx ditch that they consider as having been formed by running water are actually caves formed by the underground water in geologic antiquity. . . . Thus, they misinterpreted the geological features that are the basis of their theory.<sup>30</sup>

I think we must accept these conclusions and realize that rain is not the answer. It is helpful also to know that the microscopic erosion processes within the stone, explained in such detail by Lal and his colleagues in their publications, have gone on continuously from antiquity to the present. However, all the conclusions reached by Lal and his colleagues are by no means incompatible with the Sphinx Moat. Indeed, the existence of a moat provides the additional moisture needed to bring forward the normal microscopic erosion processes within a reasonable time frame. The vertical scouring caused by dredging would have accentuated the preexisting vertical fissures caused by the underground water, which, although they may already have been there to some extent, would have been deepened. And the horizontal erosion patterns on the Sphinx, which owe nothing to descending water of any kind, were caused not only by moat levels rising and falling, but by the microscopic erosion processes greatly accentuated by genuine soaking in a moat, its withdrawal when the level sank, and its repetition when the level rose, with the weakening effect on the stone that would have resulted. (There would have been a problem of “rising damp,” or moisture oozing upward, within the Sphinx body in addition to extra microscopic erosion processes.) In other words, all the arguments put forward by Lal Gauri to counteract the ancient-rain theory are wholly compatible with and mutually strengthening to the Sphinx Moat hypothesis.

And at this point we should turn to the Greek historian Herodotus (fifth century BC), who reports fascinating though highly garbled traditions that further substantiate the idea of an island surrounded by water at Giza:

Chephren also built a pyramid, of a less size than his brother’s [Cheops]. I have myself measured it. It has no underground chambers [these were unknown then, but are known today, having been discovered first by the Arabs and then rediscovered by Giovanni Belzoni<sup>31</sup>], nor is it entered like the

other [the Great Pyramid] by a canal from the Nile, but the river comes in through a built passage and encircles an island, in which, they say, Cheops himself lies.<sup>32</sup>

We have already not only encountered the tradition that a king lies buried beneath the Sphinx (as mentioned by the Roman author Pliny and in countless subsequent accounts by Arabs and travelers' reports), but we have seen that there was a shaft leading to a burial chamber and extending right down through the body of Sphinx, into which many people have entered, and of which we even have the dimensions, although it was destroyed by Émile Baraize's "restoration" of the Sphinx in the 1920s. I have fully described this in an earlier chapter. Since there is nowhere else on the surface of the Giza Plateau where an island could be said to exist, we must presume that Herodotus's very late account is a garbled tradition of the Sphinx Island, which indeed was fed by water from the Nile, which "comes in through a built passage and encircles an island." Much of what Herodotus wrote about Egypt was lifted from an earlier author named Hecataeus of Miletus, born 549 BC (not to be confused with the better-known but much later author Hecataeus of Abdera, who also wrote about Egypt). Therefore, the account given by Herodotus may have been garbled by him from an earlier account by Hecataeus, to which scribal errors may also have contributed, since the standard of copying of manuscripts at that early date could easily have resulted in a copy of Hecataeus's work, which already contained many serious scribal errors, coming to Herodotus's hands; we need not attribute them to Herodotus personally. Furthermore, because the Sphinx is beside the Valley Temple of Chephren, the association of the Pyramid of Chephren with the Sphinx Island is a natural garbling of the true association of the Valley Temple of Chephren with the Sphinx Island. But this is not the only relevant passage from Herodotus, for he also wrote that the Egyptians claimed the following with regard to the Great Pyramid:

They worked in gangs of a hundred thousand men, each gang for three months. For ten years the people were afflicted in making the road [causeway] whereon the stones were dragged, the making of which road was to my thinking a task but a little lighter than the building of the [Great] Pyramid, for the road is five furlongs long and ten fathoms broad, and raised at its highest to a height of eight fathoms, and it is all of stone polished and carved with figures. The ten years aforesaid went to the making of this road and of the underground chambers on the hill whereon the pyramids stand [i.e., the Giza Plateau]; these the king meant to be burial-places for himself, and encompassed them with water, bringing in a channel from the Nile.<sup>33</sup>

This is yet another garbled later tradition, in which confused memories from the past are distorted. The reference seems to be to the Chephren Causeway, or otherwise to the now destroyed Cheops Causeway, or perhaps a conflation of the two. In any case, the Chephren Causeway runs directly to a monument at "the hill whereon the pyramids stand," said to be a burial place of a king, which does indeed seem to have been encompassed with water brought "in a channel from the Nile." In other words, this describes perfectly the Sphinx Island at the very beginning of that great causeway, the rainwater from which even poured directly into the Sphinx's moat.

It is not often noticed either by Egyptologists or by classical scholars that Herodotus does not actually say that the underground chambers to which he refers have anything whatsoever to do with any of the pyramids. He says instead something quite different: that the chambers are inside the *hill*. It happens to be the same hill, or plateau, on which the pyramids also stand. In other words, he is describing underground chambers of the Giza Plateau itself, and definitely *not* underground chambers of a pyramid. The distinction seems to have eluded everyone. This overt ancient evidence *against* the pyramid-tomb theory



is ignored by all Egyptologists, and it would not suit many of them to be forced to take note of it, since it opposes their favorite theory.

As we know, the Giza Plateau is riddled with underground chambers everywhere. So the question we have to ask is: Where in the Giza Plateau, associated with underground chambers and near a giant causeway, can we find an island into which the water of the Nile has been admitted by a channel?

The answer is that there is only one such place: Sphinx Island.

It has often been a subject of speculation why Herodotus never mentions the Sphinx. In his day, it was probably covered by sand up to its neck. It was cleared only some centuries later under the Ptolemies, and the clearance nearly a thousand years earlier in the New Kingdom by Thutmosis IV was long forgotten, its effects long vanished. It generally took twenty years or less (before the total clearance in 1936) for the Sphinx to be covered over in sand, and enough time had elapsed by the time of Herodotus for the Sphinx to have been covered nearly one hundred times. It is difficult to see the Sphinx from the pyramids, especially if it is only a head protruding from the sand, and Herodotus probably was not taken down to its site. This assumes that the accounts of Herodotus are really firsthand accounts, which has been passionately disputed both in ancient times and today, with some classical scholars believing that Herodotus pinched most of his material from earlier authors, so the omission of an account of the Sphinx might merely be a sign of his laziness in copying! The Sphinx Temple at that time was definitely covered entirely and forgotten. We do not know how much of the Valley Temple would have been visible then—probably very little or none at all. So there was not much to attract attention from a distance. The simple fact is that at the time of Herodotus, or even the time of Hecataeus, there was no good reason to exert oneself in the heat by walking down the hill, as there were no temples to be seen there, the Sphinx had not yet been cleared, and there was only with difficulty a view of some stone object sticking up out of the sand in the distance, which could not be identified even as the back of a head. Herodotus makes it clear with both descriptions he has given of islands surrounded by Nile water at Giza that he is drawing on Egyptian accounts, for he specifically says: “Thus far I have recorded what the Egyptians themselves say. Now . . . I will add thereto something of what I myself have seen.”<sup>34</sup>

And he then goes on to discuss other things. But another interesting detail of what Herodotus has told us about the Great Pyramid is that Cheops specifically did *not* intend to have himself buried inside but rather in a chamber elsewhere beneath Giza and, according to one tradition, beneath the island surrounded by Nile water. So this is clear evidence against the theory that the Great Pyramid was designed as Cheops’s tomb. As I have already said, it is difficult to understand on any logical basis why no Egyptologist seems ever to have noticed this explicit evidence from antiquity *against* the prevailing theory that Cheops built the Great Pyramid as his own tomb. Once again, we encounter a “consensus blindness” situation, where everybody seems to be determined not to see something that is right there in front of his eyes.

When considering these things, it is just as well to take notice of the specific words of the Egyptologist Wallis Budge, who gave a long description of the underworld at Rostau (which he spelled Re-Stau) in describing the Egyptian books dealing with the sun god’s journey through the underworld at night. When the sun god’s boat comes to the fourth gate, the sun god has to dismount and go across the sands of Giza on a new boat that is dragged; the sun god then

. . . has entered the kingdom of Seker [his spelling of Sokar], who is probably the oldest of all the gods of the dead in Egypt. . . . The main corridor is called Re-Stau. . . . An inscription . . . tells us that it is the road by which the body of Seker enters and that his form is neither seen nor perceived; hence

it is clear that the road by which [the sun god] passed through this Division was supposed to be high up above the dominions of Seker, and that he never saw that god at all. . . . The hidden gods who march in front of the boat [of the sun god as it is dragged over the sand] are few in number, and the names of many of them are unfamiliar; some of them are connected with Osiris, and all of them are under the control of Anpu, or Anubis, and perform some act which helps the boat along.<sup>35</sup>

As I have mentioned already, Anpu is the Egyptian name, which we write in the Greek manner as Anubis.

Once again we have the clearest statement that Anubis was presiding in some sense over all these events at Rostau, which encourages us to think that Anubis as the Great Sphinx is being specifically referred to once again.

We can now begin to look at the many references in the ancient Pyramid Texts, Coffin Texts, and others that appear to refer to the Sphinx Moat. We can start with the Pyramid Texts because they are the earliest. And indeed, the earliest of the Pyramid Texts are those that are inscribed on the interior walls of the Fifth Dynasty Pyramid of King Unas (reigned circa 2375–2345 BC).

I once had the wonderful opportunity of sitting for six hours inside this small pyramid, surrounded by the magical texts. There are hundreds of stars painted all over the ceiling. The texts cover all the walls and almost smother the interior, as if all the words that wished to be uttered were clamoring, almost as if they were raising their hands and entreating to be heard, a thousand voices whispering urgently at once: “Listen to me! Listen to me! Not to *him*! To *me*!” The name of King Unas is everywhere, in its royal cartouche with the beautiful hieroglyph of the long-eared hare. This was the first time that a pyramid’s interior had been inscribed with any texts at all. And suddenly they are all there, like an infestation, and the desperate need to glorify the immortality and resurrection of the king is deafening, overwhelming, insistent: “He will live forever! He will live forever!” The king will rise to the sky, he will become Horus, he will become this god, he will become that god, he will be glorified, he will surpass all the gods. One wonders what suddenly possessed the Egyptians at this period to burst into this riotous affirmation of the eternal life of their dead king. The pyramid is pocket-sized, as they could not build them properly anymore and their civilization was in decline. It has been suggested that the explosion of texts inside the Fifth and Sixth Dynasty pyramids, starting with this one, was a psychological compensation for the fact that the pyramids were so small, just as a small person can have a big temper or enormous ego by way of compensation for his size (such as Napoleon). But despite the tiny size of the pyramid, sitting inside it was a profound experience of timelessness, of the silence of eternity, of the brooding mantras that were intoned from the walls with the long vanished voices of the priests who had recited them here as they slowly led the burial ceremony into this vault where the king’s mummified remains would rest, awaiting the fulfillment of his “sure and certain hope of resurrection,” to use the words of the King James Bible. The pyramid is closed to visitors, except by special permission, to preserve these very texts on the walls, which elbows and hands and breath could damage. Already the paint on them has faded. But their voice has not faded; it has indeed been regained after 4,350 years. And the pharaoh thus indeed lives on, through these voices, though his remains were plundered and scattered in distant antiquity and the huge and heavy sarcophagus lies open, empty, and desecrated in the silent room where I sat and brooded on his lost world.

In these earliest surviving religious texts from Egypt, we find a fairly clear description of Anubis presiding or “ruling” over Giza, which is called “the Western height.” In Egyptian religious and mythological terminology, the realm of the dead is often called “the West,” and the dead are “the



Westerners ” Osiris, as god of the dead, for instance, “presides over the Westerners.” The earliest deity who presided over the Westerners was Khentiamentiu, which means Foremost of the Westerners. He was a jackal, and in fact he was Anubis. By the Fifth Dynasty his identity had begun to become combined with the god Asar (Osiris in Greek), husband of Isis. This terminology occurs hundreds of times, and was standard, in the same way that Christians often refer to Jesus as “the Savior” without actually saying his name, and sometimes call him “the Lamb of God.” All religions have certain standard epithets like these that they use over and over again to show reverence and as a kind of shorthand among themselves. There is also a habit in most religions to avoid directly mentioning the name of a divinity too often, as it might be considered as acting too familiar and even irreverently. For instance, Christian priests, when speaking of Jesus in their sermons, very often refer to him as “our Savior,” using that or other epithets more often than they actually say the name Jesus or the name Christ. (Baptist ministers are much less restrained and seem to compete to see who can mention the name of Jesus most often within a given period.) More formal epithets such as “Lamb of God” are reserved for hymns, services, and ceremonies. For instance, in the Anglican Church, just before communion, the priest holds aloft the host and says to the congregation as he welcomes them to come forward: “Behold the Lamb of God!” He does not say, “Look, everybody, here’s Jesus!” because that would show less dignity. Similarly, one would not address Queen Elizabeth of England as “Liz.” So we have to keep in mind that the ancient Egyptians were similar in their use of formalisms and epithets, and that such works as the Pyramid Texts were formal invocations and spells in which the names of divinities had to be varied in a flowery manner for the correct degree of reverence to be shown. Osiris in his underground chamber was “ruler of the Westerners,” but Anubis specifically “rules over the Western height”:

*Thoth, hurry! Announce to the gods of the West and to their spirits:  
He comes indeed, this [King] Unas, an Imperishable Spirit,  
decked like Anubis on the neck, who rules over the Western height.*<sup>36</sup>

This is a very specific allusion to Anubis as the presence who is acknowledged to be “ruling” over Giza, which is the only part of “the West” in ancient Egyptian lore that can be said also to be a “height.” (Twice in the Pyramid Texts and many times in later ones Anubis is referred to as Anubis of the Hill or Anubis of the Height.) As for him being “decked . . . on the neck,” it is highly likely that the Sphinx had rich hangings around its neck not only when it had its present form (when these hangings are actually depicted in New Kingdom stelae, so that there is ancient pictorial evidence of their existence; see figures 3.21 to 3.23 for examples of the Sphinx bedecked with a neck hanging), but also when the Sphinx was Anubis. The reference to this decorative aspect of Anubis is a further confirmation that an actual statue is being referred to in this text. It would be presumptuous to describe a god as “decked . . . on the neck,” but acceptable to describe a statue of the god in that way.

The Pyramid Texts and subsequent ones are full of references to one of the major features of the netherworld at Rostau, the Jackal Lake. I believe that the Jackal Lake, which also had other names, was what the Old Kingdom Egyptians appropriately used as their name for the Sphinx Moat. In fact, like all the sacred entities and places in Egyptian lore, the Jackal Lake also has various epithets. It is also called the Lake of Fire, often within the same passage as its formal name of Jackal Lake or Lake of the Jackal. Other names for it appear to be the Canal of the God, the Canal of Anubis, the Winding Waterway (presumably because if you go along it on a boat, you circumnavigate the island of the Sphinx), the Lake of Life, the Lake of Cool Water, Broad Lake, the Lake of Rushes, the Field of Rushes, and, most often of all, simply the Lake of the Netherworld (or Lake of the Duat, Duat being the netherworld). As for its connection with

rushes, it is highly likely that rushes grew in part of the Sphinx Moat in antiquity (most likely the dead western end where the sand/ dust tended to accumulate), just as they do today at the west end of the winding waterway of the ancient Osiris temple, the Osireion, at Abydos

A mysterious ancient text known as *The Book of Caverns* describes the netherworld and gives intriguing references to Anubis. Although in its surviving copies this text occurs rather late, appearing for the first time in the reign of King Seti I of the New Kingdom and repeated again on the walls of the Valley of the Kings tomb of King Rameses VI, its contents seem rather archaic compared to some other texts of this kind. The book, copied from the walls of two ancient monuments, was translated into English by Alexandre Piankoff, who says of it: "The whole suggests a gigantic papyrus which has been unrolled the length of the walls."<sup>37</sup> In fact, all the netherworld books inscribed on walls were copied from papyri originally, so they are all older than the dates of their appearance in tombs. Figure 6 39 reproduces a previously unknown engraving dating from 1837 of the sarcophagus of King Seti I (died circa 1278 BC), which is now in London, and which bears such a netherworld text on it; this picture has not been reproduced since its original publication, and, as it is unknown to Egyptologists, I thought I should put it into circulation for everyone to see.

I suspect that the original "gigantic" papyrus from which *The Book of Caverns* was copied was considerably older than its initial use by this same King Seti I, and that it embodies much more archaic lore than many similar texts of the New Kingdom tombs. I asked Professor Erik Hornung about the relative dates, and he believes the illustrations of *The Book of Caverns*, "being richer in iconographic fantasy (which reached its climax in the twenty first dynasty)" and also containing a view of the mythical serpent Apopis, which was no longer entirely that of an evil creature, meant that the book was not as archaic as I thought. I certainly accept his views on the iconography. But I believe that some of the text precedes that iconography and is extraordinarily archaic, drawn from a far earlier text. On the other hand, if one looks at the netherworld text known as *The Book of Gates*, one is struck by the actual text itself having become too fantastic and baroque, a jumble or improvisation, in fact, and wholly lacking the archaic qualities that so strike me in *The Book of Caverns*.



Figure 6 59 The sarcophagus of King Seti I of Egypt (died circa 1278 BC), which was acquired in the eighteenth century by Sir John Soane and is still on display in the Soane Museum (his house, preserved as it was at his death, now open to the public) in Lincoln's Inn Fields in Holborn, London, a few minutes' walk from Dickens's Old Curiosity Shop, which still stands. This engraving was published in 1837 in a periodical of the time. Netherworld scenes are depicted on the sarcophagus, accompanied by texts describing the events and phenomena to be encountered there. (Collection of Robert Temple)



*The Book of Caverns* recounts a series of caverns of the netherworld and seems to be based very much at Rostau. There are several suggestive references to Anubis as the presiding presence. At one point, Osiris is described as having “set him [Anubis] in his place without his being able to leave, having been established in the West.”<sup>38</sup>

This is a very strange way to describe Anubis. It certainly seems to describe a prominent statue, as what else could possibly be meant by being stuck in place and not able to leave? Furthermore, the same text also describes “those who are between his arms.” Although Anubis was the master embalmer, corpses being embalmed are not actually held in the arms of the embalmer, and though one certainly cannot insist on it (as it could be just an exaggerated reference to his work as an embalmer), the reference seems to me to be to something quite different. It sounds strangely like the worshipping of the Sphinx at the altar between its arms that went on for centuries and may refer to an earlier stage of this worship in the Middle Kingdom, by which time the moat was dry. It is probable that the moat was filled with water only during the Old Kingdom, and by the time of the Middle Kingdom it had become a dry ditch containing a great deal of sand, which eventually overwhelmed it, so it was only cleared again by Pharaoh Thutmosis (Thothmes) IV as recorded on his Dream Stela centuries later.

This same text of *The Book of Caverns* refers to Anubis four more times in a manner that describes his presiding presence at Giza. The sun god Re (Ra) addresses a cavern of the netherworld, referring to the secret image of the god Sokar, “whose image is great, created by the Netherworld, engendered by the Silent Region, he whose image is unknown, unique mystery hidden from the inhabitants of his cavern. O Behold, I pass near you, I have placed Anubis as your guardian, I give you light.”<sup>39</sup>

This is a clear reference to Rostau and to Anubis being “placed as guardian” there. Later, the sun god Re again speaks to “the Cavern of the Forms of Osiris,” which is well known to be a feature of Rostau, and enumerates many features of Anubis, referred to repeatedly as “Power of the West.” At the end of this litany of praise for Anubis, Re says: “O Anubis, O Anubis! Behold, I pass Anubis, when I pass through those who are in Exalted Earth [the necropolis]. I pass through the mysterious Netherworld”<sup>40</sup>

This indicates that to enter the netherworld at Rostau, it was necessary to pass Anubis, who stood guard at its gate, another suggestion of the presence of Anubis as a statue there.

Further on in the text, in speaking of the dead, we are told, “Their bodies pass by while Anubis is the guard.”<sup>41</sup> And Re again speaks to a netherworld cavern where two goddesses lie buried, once again presumably at Rostau: “O the two great and powerful goddesses whose mysterious coffins are guarded. It is Anubis who guards them as well as the Head of Re—mystery of He (who is Lord) of Forms.”<sup>42</sup>

The Lord of Forms is Osiris, who lies buried at Rostau, and is here identified with the Head of Re, which appears when the sun rises over the horizon. The information about the two goddesses lying buried in a cavern at Rostau is unfamiliar and is probably a stray survival of an early and largely lost tradition predating the Osiris cult concerning the cobra goddess of the north and the vulture goddess of the south, who were so prominent as a pair in the Archaic Period. (It was, after all, Sokar who was the original Lord of Forms, and he became merged with Osiris and essentially replaced by him in the Fifth Dynasty.) The goddesses Isis and Nephthys are constantly shown as a pair on post-Old Kingdom sarcophagi, enfolding the dead pharaoh in their protective winged arms, and they probably perpetuate this motif that we find in this text. (See figure 6.40.) However, I suspect they are not the original form of what is intended here. In my opinion, further research and study are necessary to elucidate this curious reference to the “two goddesses” being buried at Rostau and comprehend what is meant by “their mysterious forms.” I am not at all content to let this matter rest, but I do not yet have a sufficient lead to feel that I

have the thread in my hand. One thing that occurs to me at this early stage of my thinking on the matter is that this same place, the Door of Geb (the primeval Earth god) at Rostau, was meant to be guarded by a double-headed lion named Ruti, and this beast with two heads may well be the “mysterious form” concealing the truth about the two goddesses, each goddess being secretly represented by one of the heads of Ruti. (Another name for Ruti is Aker: see figure 1.49.) That mention of those two goddesses is otherwise suppressed in the surviving texts about this place must be a very important clue in itself; they may represent some deeper mystery that was not supposed to be discussed. Another thing that occurs to me is that there are two temples, not one, immediately next to each other at that precise spot. Could the double-temple architectural motif be a hint at the double-headed lion motif, and in turn an esoteric reference to the two great goddesses? Why so much twinning? Unfortunately, this is mythological terrain that remains untrodden and approaches more closely than usual to the underlying mysteries that the Egyptians took such pains to conceal. It is very difficult to know what the name Aker means because there is no other form of it in Egyptian other than the plural form that refers merely to the serpents of Aker. It may be a foreign loan word. Alternatively, it may be connected with the verb *ak*, which means to bend (as in bending one’s knees) or to bow. Those are the only Egyptian words spelled *ak*, and although there are words spelled *akh*, they use a different consonant, and I would hesitate to suggest any linguistic connection. Really, Aker is in my opinion a puzzling name. The name Ruti is not at all puzzling, because it is merely the dual form of Ru, which means lion; Ruti thus means the double-lion or the two lions. One may therefore safely conclude that Ruti is a descriptive epithet of Aker, rather than an actual separate name or a different entity.

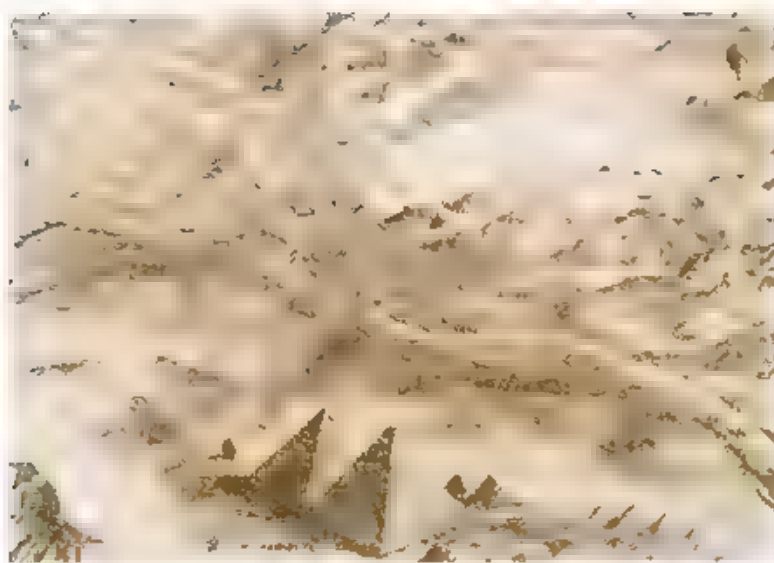


Figure 6 60 This aerial view from a balloon, looking northeast, shows the position of the pyramids of Giza and the Sphinx in relation to distant Cairo in 1882. Cairo, as can be seen, was at that time entirely on the other side of the Nile, whereas today it has crept up to the base of the Giza Plateau itself. This view highlights the position that the Sphinx held as the “guardian of the entrance to the Necropolis of Giza,” literally crouching at the entrance. The head of the unexcavated Sphinx may be seen, with the word sphinx written below it. Due to the foreshortening effect of the aerial perspective, the Pyramid of Chephren (with part of its limestone cap intact) here appears larger than the Great Pyramid beyond it, though in reality the Great Pyramid is slightly the larger of the two. The cluster of small pyramids on the right are the Pyramid of Mycerinus and its satellite pyramids, the two small ones that appear to be to the right of the Pyramid of Chephren are two of three small satellite pyramids that actually sit in front of the Great Pyramid (the third being invisible in this view). Not having flown in either a balloon or an aircraft above Giza, I cannot say how accurate this view is, or whether the distortions are due entirely to perspective or to the artist’s imaginative powers, or both.  
(Collection of Robert Temple)

There is a strange reference to an “Earth lion” in Book XI of the Sumerian/ Babylonian/Assyrian Epic of Gilgamesh. A subterranean serpent leaps up from a deep well in the form of an “Earth lion” and steals from Gilgamesh the herb of immortality just as he is about to eat it and achieve eternal life. In my



translation of the epic, published under the original title *He Who Saw Everything*, I called attention to this anomaly in a footnote: “Some esoteric meaning is probably intended, which is not clear.”<sup>43</sup> It is not impossible that this “Earth lion” may have some connection with Aker/Ruti of the Egyptians, but I mention this only as a vague and tentative possibility for those who are interested in the occasional points of commonality that seem to appear in Egyptian and Sumerian/Babylonian mythology and religion, which is a subject far from the purposes of this book and which I cannot discuss any further here.

Turning now to earlier texts, Utterance 512 of the Pyramid Texts describes the deceased soul meeting Anubis, apparently at Rostau, since Anubis is there with Geb the Earth god, they are generally described as a pair only at Rostau. Then the deceased is urged to bathe in the Jackal Lake, which is here also called the Lake of the Netherworld. The words of Utterance 512 are:



Figure 6.61. This magnificent and beautiful engraving was published in the Napoleonic series of volumes *Description de l'Égypte* in 1809. It is a copy of an ancient Egyptian temple wall carving, site unknown (possibly no longer in existence), and shows the sister-goddesses Isis and Nephthys with their angel wings outstretched protectively around the sacred symbol of the god Osiris (husband of Isis), who is seen here as a mummy holding crossed royal and divine insigniae across his chest, with his head replaced by his sacred symbol of the Djed Pillar, surmounted by two plumes with a solar disk in the middle. Usually, in pictures of Isis and Nephthys on coffin lids, the goddesses are identified by their respective names in hieroglyphs above their heads, but that is not the case here. There is an unresolved enigma about whether Isis and Nephthys are intended to be identified with the “two great and powerful goddesses with mysterious coffins and mysterious forms” said to be buried at Rostau, the underworld situated beneath the Sphinx and its two temples. The Pyramid Texts suppressed these references, but they survived in ancient texts copied from a lost papyrus and painted on the walls of the tomb of King Rameses VI at the Valley of the Kings. Anyone who wonders how deities, who are supposed to be immortal, can also be dead or even buried need only remember that Jesus “died and was buried and rose again,” as we are told by the Bible. This was meant to emphasize to us that resurrection and immortal life involve the necessity of what we call death, when we leave the illusory world of matter and return home to the eternal world of the spirit (if only temporarily, as some maintain). In order to enter that world, we first have to “die” in the flesh. “Dead” gods and goddesses were surprisingly common in the ancient world. The ancients of various cultures also tended to believe in degrees of immortality, such that, for instance, angels might “fall” and gods like Cronus, the father of Zeus, could be imprisoned in sleep as if dead. Immortality is not as simple as you might think, nor is eternity necessarily absolute in all traditions. After all, even in our daily lives we all say to one another “I will always love you,” or “I will love you forever,” or “I will never forget,” despite our statements being literally impossible. Everyone, even in religion, is entitled to exaggerate in order to make a point from time to time.  
(Collection of Robert Temple)

My father has remade his heart, the other [the original physical heart] having been removed for him [it has been removed from his corpse in the process of embalming] because it objected to his ascending to the sky [rising to rebirth] when he had waded in the waters of the Winding Waterway.

Anubis comes and meets you! And Geb gives you his hand, O my father, (even) he who guards the earth and rules the spirits. I weep deeply, O my father.

Oho! Raise yourself, my father, receive these your four pleasant *nemeset* jars [which contain the corpse’s entrails]; bathe in the Jackal Lake, be cleansed in the Lake of the Netherworld, be purified. . . . Run your course, row over your waterway like Rē [the sun god] on the banks of the sky. O my father, raise yourself, go in your spirit-state.<sup>44</sup>

The Sphinx Moat seems to have been navigated on reed floats and in small boats in religious ceremonies concerning death that involved bathing and rituals of purification. Perhaps the bodies of deceased kings were even bathed in the Jackal Lake prior to their embalming. There are numerous hints of this kind. Or perhaps this was done symbolically with a substitute, as suggested in Utterance 268: “This [deceased] King washes himself when Rē appears [when the sun rises]. . . . Horus accepts him beside him, he purifies this King in the Jackal Lake, he cleanses this King’s double in the Lake of the Netherworld.”<sup>45</sup>

In Utterance 301 we again read: “Cleanses the King, make the King bright in this your Jackal-Lake, O Jackal [Anubis is addressed here], in which you cleansed the gods.”<sup>46</sup>

The cleansing that took place in the Jackal Lake may not have involved an actual corpse, but may rather have involved the four jars used for the king’s entrails. It seems these were really carried to the Jackal Lake, and possibly the contents were removed and washed in the lake. The cleansing was said to be carried out by a goddess of whom we know little, Kebehut, who is specifically described as being the daughter of Anubis,<sup>47</sup> and who was a “celestial serpent” with the face of a jackal. (Wallis Budge used an older transliteration of her name, calling her Qebhut.<sup>48</sup>) It may be that Kebehut was a special priestess, known as Daughter of Anubis, who carried out the funeral ablution and censuring ceremony (“censing” refers to the process of fumigating something or someone with incense from a swinging incense holder called a censer), and that she also represented the goddess Nephthys. In Utterance 515 we are told that Kebehut holds the four jars, removes the dead king’s heart, and washes it in the lake, and the deceased king says, “The heart of the great god [Osiris] was refreshed on that day of awakening [the entombment of the corpse of Osiris, who became god of the dead], and she refreshes therewith my heart for me for life; she cleanses me, she censes me. I receive my meal [offerings]”<sup>49</sup>

Kebehut appears again in Utterance 674, where “she refreshes your heart in your body in the house of her father Anubis. Be purified . . . the spirits . . . shall grasp your hand.”<sup>50</sup>

It seems that the entrails, apart from possibly the heart, were not actually removed from the four jars, but that the four jars were dipped into the lake and filled with water so that the entrails were washed within their jars. This process is described in Utterance 666: “O King . . . take this purification of yours, these four . . . jars of yours which are filled full from the Canal of the God [Anubis], cleanse yourself with them as a god and go forth thence.”<sup>51</sup>

It seems that a purification at the Jackal Lake was a necessary part of the ritual for the dead king during the Old Kingdom. Anubis presided over all of this, as Utterance 676 makes clear: “. . . Anubis who presides over the God’s [Osiris/ Sokar’s] Booth [which was at Rostau] has commanded that you be purified with your eight *nemeset* jars and your eight *āabt* jars which came forth from the Castle of the God [a temple, presumably what we now call the Valley Temple, which appears to have been dedicated originally to Sokar but later to Osiris]. You are indeed god-like.”<sup>52</sup>

This same utterance places these events specifically at the Sphinx precinct: “You have your water, you have your flood, you have your efflux [the translation “sap” used by Renouf is probably better] which issued from Osiris [a process that is always described as being at Rostau, underground]. . . . This cold water of yours, O Osiris, is what is in Busiris.”<sup>53</sup>

Busiris, as we remember, is the particular region of Giza where the Sphinx is found, and its Egyptian name was Djedu, an Egyptian word that means ghosts (Although there was a city named Busiris in the Delta, the occurrence of the name Busiris or Djedu in an Egyptian religious text is always a reference to the Busiris at Giza, which may originally have had that name transferred to it by association with the



Delta city in predynastic or early Old Kingdom times (Pliny is our source for the definite information that Busiris was the Greek name of the village beside the Sphinx.)

During the reign of Amenemhet II of the Middle Kingdom, whose face I believe now to be on the Sphinx, a story called “The Tale of the Two Brothers” was written. The washing of the pharaoh’s heart in the Sphinx Moat, or Jackal Lake, before the great statue of Anubis, seems to be echoed in the story, in which Anubis himself places the heart of Bata in a bowl of cool water to resuscitate him.<sup>54</sup>

A causeway is also mentioned as being beside the Jackal Lake, as we are told in Utterance 690, where Kebehut, the Celestial Serpent, washes the dead king: “O King, your sister the Celestial Serpent has cleansed you upon the causeway in the meadow, you having appeared to them as a jackal. . . . May you govern the spirits, may you control the Imperishable Stars.”<sup>55</sup>

This may well be a specific reference to the Chephren Causeway, which runs into the Sphinx Moat. We have previously encountered mention of a causeway beside Anubis in another Pyramid Text.

The Pyramid Texts contain many more relevant references, but there is no need to consider them all. Some references from the Coffin Texts are useful, however.

Coffin Text Spell 551 suggests that a ceremony may have existed in which the Sphinx Island was circumnavigated four times on a reed float or in a small boat. The text, which is merely suggestive, has the deceased say “I have come to you, my father Rē. . . . I have gone round the watery Chaos four times, . . . I have bathed in the Lakes of the Netherworld, I have washed in the Lakes of the Jackals, I have [sailed in] the bark. . . . Going aboard the bark of Rē.”<sup>56</sup>

In Spells 33 and 35, we read of the Lake of the Jackal being called the Place of Ferrying: “Welcome, O you whom Osiris has sent. . . . I will cause him to be pure in the Lake of the Jackal among the blessed ones. . . . I will cause him to enter into the Place of Ferrying among the blessed ones.”<sup>57</sup>

The deceased bathing in the Jackal Lake is mentioned again in Spell 255: “Promoting a man’s double in the Realm of the Dead. Water is upon me, I appear as Rē; water is on my hands. . . . Nephthys has nursed me in the Jackal Lake, I am loosed in the Lakes of Peace, . . . acclamation is made to me by the lords of the West.”<sup>58</sup>

The location of the Jackal Lake at Busiris/Djedu, that is, the Sphinx precinct, is specified in Spell 292, where the deceased says: “There is opened to me the sacred place at the Lake of Jackals. O you who are over eternity, who are in your windings, prepare a path for me. . . . O you who are in Djedu. . . . It is I who eat the [word missing] which is in Djedu.”<sup>59</sup>

A terrifying aspect of Anubis presiding over a lake is given in Spell 335, Part II, where the deceased begs Atum to “save me from that god . . . whose face is that of a hound. . . . It is he who is in charge of the interior [or island?] of the Lake of Fire, who swallows shades, who snatches hearts.”<sup>60</sup>

This image is elaborated later in the same spell: “O Atum . . . save me from that god . . . whose face is that of a hound. . . . It is he who is warden of the windings of the Lake of Fire. . . . As for this god whose face is that of a hound . . . his name is ‘swallower of myriads.’”<sup>61</sup>

Here we have the further detail that the lake winds around, an evident description of it encircling its island. Spell 336 repeats this detail.<sup>62</sup>

A group of Coffin Text spells, numbers 1165–1185, relate to Rostau,<sup>63</sup> to a winding or bending waterway, and to a presiding deity of the waterway who is known both as Khepri (Khepera), the rising sun whose name was part of the name of the Great Sphinx in New Kingdom times, and Dog-face (an epithet of Anubis) Spell 1185 specifically refers to “the ways by water which belong to Rostau.” The

waterway is also called the Lake of Fire, one of the alternative names of the Jackal Lake, and Lustral Basin, because of the purificatory bathing of the deceased's organs that took place in it. As for Anubis, whose giant size is here referred to: "His name is Dog-face, whose shape is big."<sup>64</sup>

There is not much of interest in the late texts of the *Book of the Dead*, but there are some interesting references in the Netherworld Texts of the New Kingdom, so many of which derive from Middle Kingdom material, as we have seen already with the *Book of Caverns*. The texts inscribed on the shrines found in the tomb of King Tutankhamun appear to refer to the Sphinx Island in the middle of Jackal Lake as "the Island of Baba" in the netherworld,<sup>65</sup> they have clear associations with Coffin Text Spell 335, and they add further:

O Re-Atum, Lord of the Great Palace, king of all the gods, save thou the King . . . from the arm of this god whose face is that of a dog . . . guardian of the winding of the Island of Fire, who swallows corpses. . . . The Swallower of Millions is his name, he is in the Lake of Wen [Opening]. As to the Lake of Fire, it is between Neref [a strange name, see below; it was on the southern side] and Shenit [sister]. . . . Baba is his name. [The name Baba is another puzzling one. Bābā means to drink, or, apparently, to get drunk on blood, but nothing else.] He is the guardian of the winding of the Lake of the West.<sup>66</sup>

The name Broad Lake is used to describe the abode of Osiris-Sokar, another reference to the lake at Rostau.<sup>67</sup> And the cleansing of the heart in the waters of Rostau is twice referred to in a curious way. One of the many epithets known to be used of Osiris at Rostau is Weary Heart. The Tutankhamun texts tell us that the deceased claims: "I am enduring in Busiris . . . the holes are being opened to wash Weary Heart, the mystery of Mysteries in Ro-Setau [Rostau]," a passage that occurs twice. And a third passage says: "I am enduring in Busiris . . . I open the holes to wash Weary Heart, I hide the Mysteries in Ro-Setau."<sup>68</sup> These may simply be references to the washing of the deceased king's heart in a jar in the Sphinx Moat, or they may refer to the letting of water from the moat through some holes down into the subterranean precincts as an ablution intended for the remains of Osiris. Probably it refers to the former, a rite that we have already encountered. This Tutankhamun material, therefore, derives from Old Kingdom times because of the similarity to the vastly older sources, the Pyramid Texts. The Tutankhamun texts also speak of the mysterious presence brooding over the Jackal Lake by saying: "I know the name of this god, it is He who is on his Lake."<sup>69</sup>

The strange name Neref given above as part of the topography of Rostau occurs in the Tutankhamun texts again in the variant form of Nareref, where it is defined as "the Southern Gate of the Mound of Osiris," which is described as being "opposite the lake of the just," thus again clearly mentioning the existence of the lake at Rostau. However, the translator Piankoff is not absolutely certain that *lake* is the correct word, and in a footnote he says an island may really be intended, within a lake. Neref, or Nareref, was transliterated as Naarruf by Wallis Budge in an earlier era and means "the place where nothing grows."

Osiris is described by Isis in one of the Tutankhamun texts as emerging from the netherworld, presumably again at Rostau, at "the House of the Lake,"<sup>70</sup> which is presumably one of the old epithets of either the Sphinx Temple or the Valley Temple. And the topography of Rostau is again referred to as a "city on the water": "Thou travellest in thy barge in this city on the water. He rows in this field close to the body of Osiris. . . . He [the king] lands at these mysterious castles [presumably the two adjoining temples] which contain the image of Osiris. This God calls above these mysterious castles. . . . The majesty of this



god establishes this city in the Netherworld for these gods ”<sup>71</sup>

These many references in the shrine texts of Tutankhamun are very archaic. But by and large, memory of the long-vanished Jackal Lake had faded by the time of most of the New Kingdom texts, and even the archaic tradition mentioning it as a sacred feature in the tradition seemed to have no point any longer to the priests. Whereas the Papyrus of Nisti-ta-Nebet-Tauí speaks of “Anubis, the Great God Imyt [the sacred symbol of Anubis], Lord of the Holy Land, He at the Head of the Necropolis,”<sup>72</sup> thus giving a correct impression of the great statue of Anubis seated at the entrance to the Giza Plateau even though it no longer existed in its original form, all reference to the presence of water has disappeared.

I should mention in passing that the hieroglyphic depiction of the name of Rostau features coils of rope. I regard these as images of the long ropes used to lower heavy stone sarcophagi down shafts into their subterranean abodes.

When I was working with my wife and a colleague in the Sphinx Temple, Olivia and I both had the same subjective impression. We felt as if we were walking around in an area that for some part of its history had been submerged in water. It has a kind of “underwater” look and feel about it. Of course, this is just a personal feeling, but I thought it worth mentioning, as so few people have ever set foot inside the Sphinx Temple, which has been closed to visitors for much, or perhaps all, of the time since it was cleared in the 1930s. I think it is at least possible that the Sphinx Temple was partially flooded on an intentional basis during the Old Kingdom when the Sphinx Moat existed. This state may have existed only during the inundation months. Looking at the twisting and turning ways inside the structure (see figure 6.15 for a photo from above), I can imagine a ceremony accomplished in small boats or on reed floats that made their way along the interior corridors and bends of the temple on water. In itself, there is nothing improbable about this. And perhaps the reference above to the “city on the water” at Rostau refers to this state of affairs, with the “castles” of the city being the Sphinx and Valley Temples. Perhaps the large “well” in the center of the entrance to the Valley Temple was really a drain, to help drain away the floodwaters from that temple after the inundation receded. It is easier to think of the “well” as such a drain than as a genuine well, with the Nile at least lapping at its doorway and in danger of plunging down it and polluting any true well water. It was this “well” into which the famous huge seated statue of Chephren with the falcon wrapping its wings around his head (now proudly displayed in the Egyptian Museum at Cairo) was thrust in a time of turmoil, thought to be the First Intermediate Period. The priests who presumably wished to save this statue from destruction may have found it convenient to thrust it down a drain that was still full of dirty drainage water, where it could not be seen, rather than into a clear well, where it would have been visible during the plundering of the temple.

One of the traditional names of the god Osiris was Water of Renewal, followed strangely by a determinative sign of a vase. (A determinative sign is a hieroglyph at the end of a word or name that is read not as a letter or syllable but as an indicator of the meaning of a word, such as for instance drawing a picture of a goddess after a name to indicate that the name is that of a goddess; the sign thus determines the nature of the name or word.) This name occurs in the Pyramid Texts inscribed on the walls of the Pyramid of King Pepi I and even survives in the *Book of the Dead*. I believe this refers to the use of the vase containing the heart, which was washed in the moat, bathing in the water symbolizing an act of renewal and rebirth. It was Renouf who made a special point of commenting on this epithet of Osiris in the notes to his early translation of the *Book of the Dead*.<sup>73</sup> Once one is aware of the ritual of the bathing of the deceased king’s heart and other internal organs in their four jars in the Sphinx Moat, many hitherto obscure passages in the Pyramid Texts become clear, such as the one in Utterance 509: “My entrails have been washed by Anubis.”<sup>74</sup>

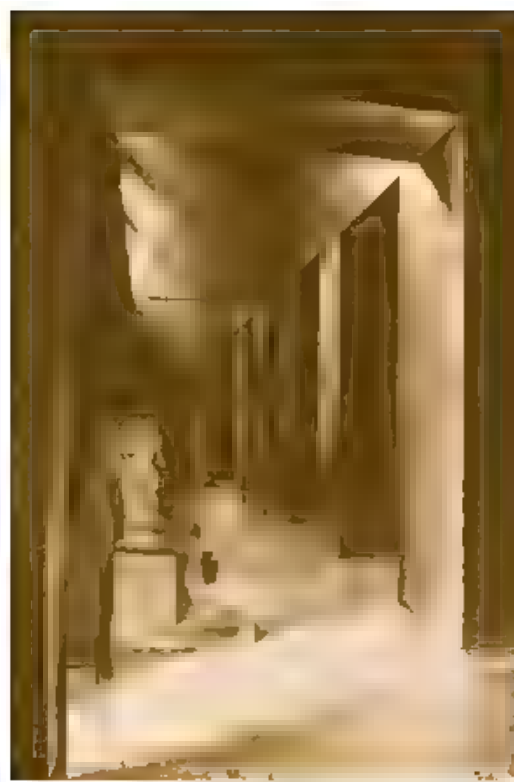


Figure 6.62 This is an imagined reconstruction of the interior of the Valley Temple of Giza. We see here the transverse hall, which runs north to south, at the eastern end of the structure. Here it is called by the name of the Pillared Hall (*Pfeilersaal* in German). A row of statues of King Chephren is envisaged here, sitting in the tranquil and eternal deathly gloom of faint light filtering in through narrow slits in the roof. The pillars are of solid granite, massive blocks weighing tens of tons each. The floor is of white Egyptian alabaster, called travertine. This is a very evocative view drawn by A. Bollacher and based on the reconstruction by Uvo Hölscher, who excavated the structure fully for the first time. It was published as plate 5 in Hölscher's book, *Das Grabdenkmal des Königs Chephren (The Funerary Monument of King Chephren)*, Leipzig, 1912. Fragments of many Chephren statues have been found in the vicinity, and one large whole one is preserved in the Egyptian Museum at Cairo. It was thrown down a well beneath the temple, probably by priests who hid it there in a time of turmoil to preserve it. The Old Kingdom period of Egypt came to an end with the Sixth Dynasty, when terrible droughts and flood and plagues devastated the country for about 150 years, between approximately 2150 BC and 2000 BC. During this period, social order broke down and mobs rampaged around the Giza Plateau, smashing everything, including the statues of Chephren envisaged here. It was at that time that I believe severe damage was done to the original head of the Sphinx, so the recarving that we see today was done from a kind of stump of the natural head. The period when civilization and the rule of law and order returned to Egypt about 2000 BC is the period that we call the Middle Kingdom. The period of turmoil between the Old Kingdom and the Middle Kingdom is known to archaeologists as the First Intermediate Period. (There was a second intermediate period, which separated the Middle Kingdom from the New Kingdom.)

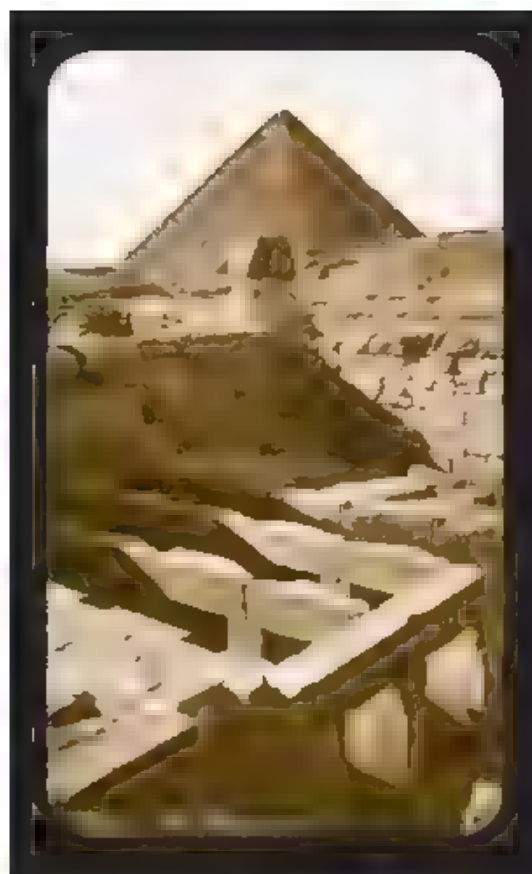


Figure 6.63. A photo of the Sphinx taken at a specific moment in 1936, after Selim Hassan had reconstructed the lappets of the headdress, after he had removed the scaffolding around the head, but before he had erected scaffolding around the main body of the Sphinx to smear more cement over the body cracks that Baraize had largely filled up with cement ten years earlier. In the foreground is the fully excavated Valley Temple. (*Collection of Robert Temple*)

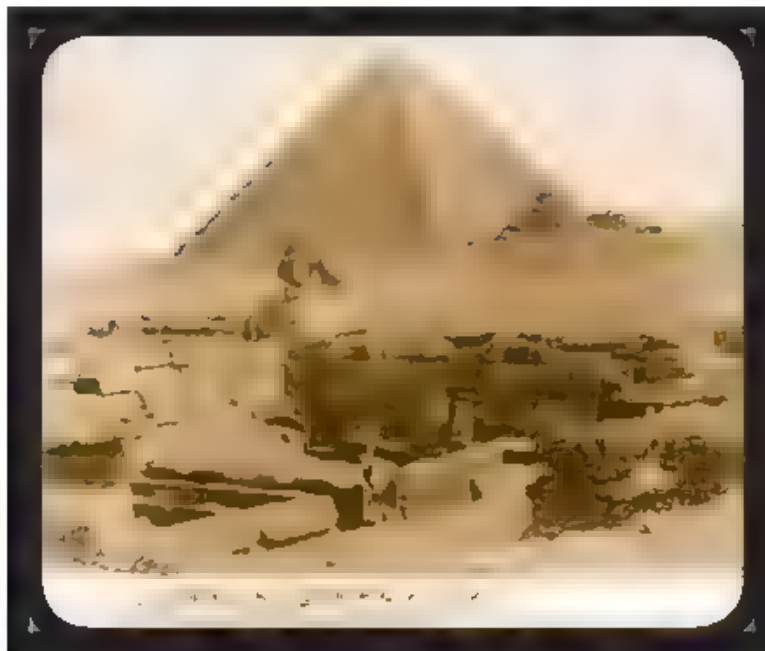


Figure 6.64. A photo circa 1890, showing the Sphinx behind the Valley Temple, only the interior of which was so far excavated. The Great Pyramid is behind. (*Collection of Robert Temple*)



Figure 6.65 This nineteenth-century French engraving shows how Auguste Mariette excavated only the interior, but did not clear the exterior, of the Valley Temple at Giza during the years 1853–60. It is in the foreground, and at that time was called the Sphinx Temple, because the true Sphinx Temple had not yet been discovered. The head of the Sphinx is seen behind, and in the background is the Great Pyramid (*Collection of Robert Temple*)



Figure 6.66. An old glass-slide photo circa 1870/1880 showing the Sphinx in front of the Great Pyramid, and in the foreground the excavated interior of the Valley Temple, which was cleared during a seven-year period between 1853 and 1860 by Auguste Mariette. (At that time it was called the Sphinx Temple, because the true Sphinx Temple in front of the Sphinx was still covered by sand and was not discovered until the 1930s.) (*Collection of Robert Temple*)

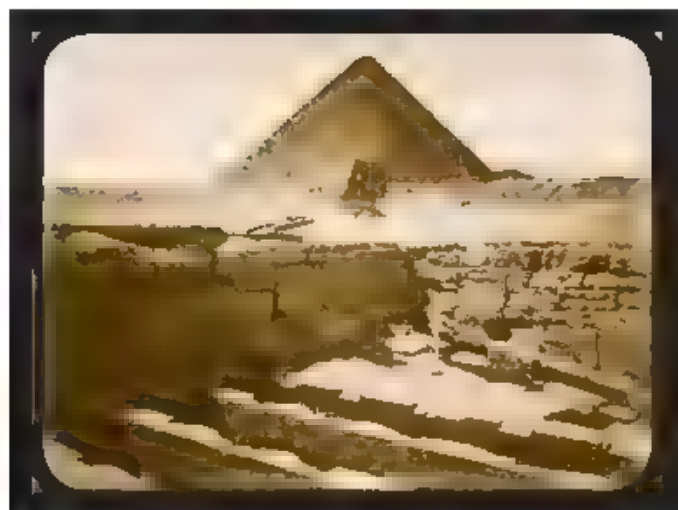


Figure 6.67 This old photo by Bonfils, probably dating from the 1890s, shows the Valley Temple sanding over subsequent to 1870, when its interior had been excavated by Mariette. Walls made of small stones closely hug the west wall (at rear in photo) and the north wall (right in photo). The Valley Temple during the period from the New Kingdom onward acted as a kind of sand-filled megalithic foundation for inferior structures of small stones and mud brick, which even in this photo have not been fully cleared away. It was only when Uvo Hölscher finally excavated the Valley Temple in its entirety and cleared its outer walls that all



these later rubbishy structures were removed his report was published in German in 1912 (*Collection of Robert Temple*)

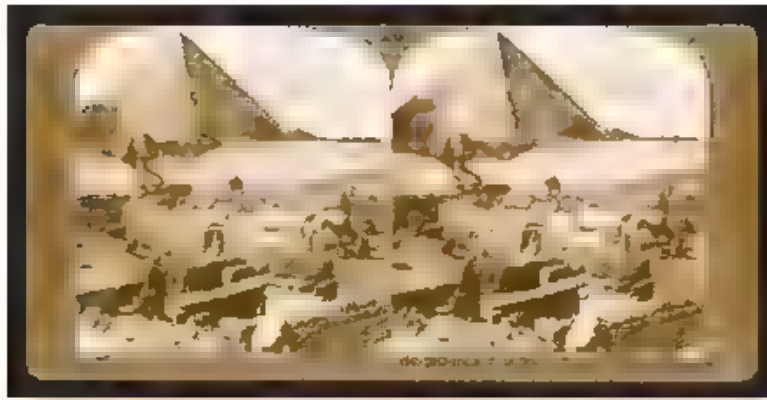


Figure 6.68. Yet another view of the foundation wall of small stones (foreground) built into the eastern end of the Valley Temple's roof. (*Collection of Robert Temple*)

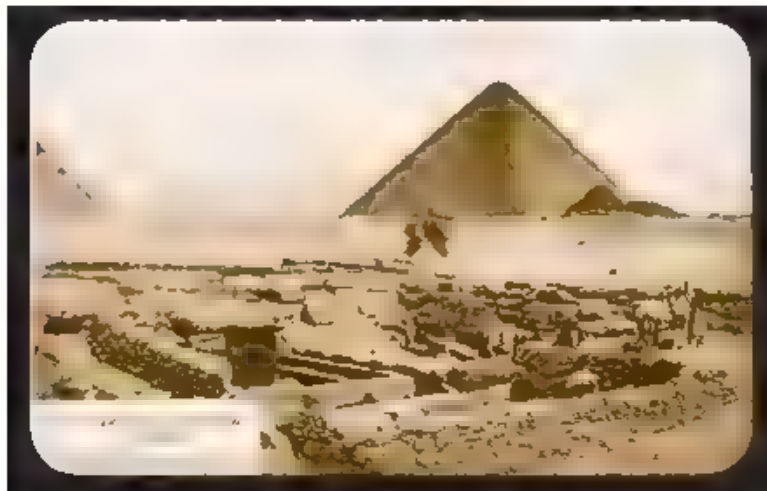


Figure 6.69 Another view of the foundation wall of small stones that was built into the eastern end of the Valley Temple roof (*Collection of Robert Temple*)

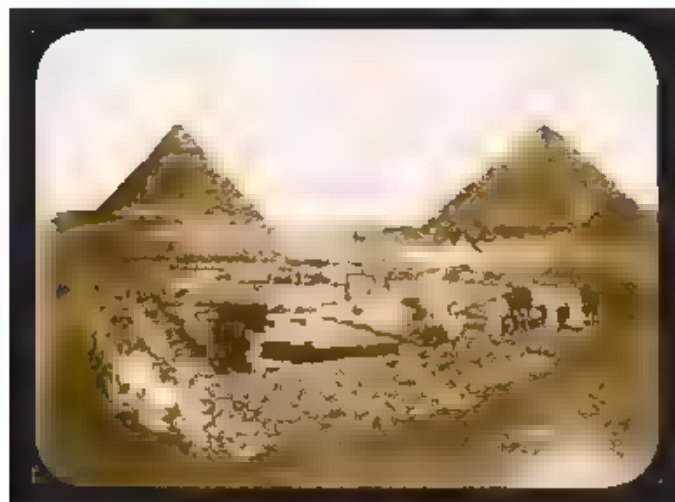


Figure 6.70 This is how the Valley Temple looked about 1870, after the excavations of Auguste Mariette. The interior had been excavated, but the exterior was essentially uncleared. Furthermore, the eastern face of the structure was covered over with this crudely constructed wall of small stones, which extends also about halfway along the top of the southern wall of the temple and then bends inward as well. The wall was actually a crude stone foundation of a building that stood for centuries on top of the Valley Temple's eastern half. Obviously, no trace of this crude foundation wall survives today. I have placed a highly enlarged version of this photo on my dedicated website supplementary to this book ([www.sphinxmystery.info](http://www.sphinxmystery.info)) so that archaeologists can study the fine detail, as the photo has extremely high definition and depth of field and yields a great deal of detailed information about what the site was like prior to the excavations of Uvo Hölscher (*Collection of Robert Temple*)



Figure 6.71. This old Victorian glass slide gives a tinted view of the Sphinx seen from the southeast corner of the Valley Temple, at a time when only the interior of the Valley Temple had yet been cleared, and the sand still stood around about it. This was one of the most popular vantage points for photos of the Sphinx taken at that time. (*Collection of Robert Temple*)

Such passages are no longer seen merely as general descriptions of the embalming process carried out symbolically by Anubis, but as a specific ritual carried out in the presence of the giant statue of Anubis in his Jackal Lake. Sometimes the topography is muddled, or at least the religious lore is, and the goddess Isis intrudes onto the scene. The mythological context can be altered and expressed in terms of Isis and her son Horus, as in Utterance 510 of the Pyramid Texts:

I travel the Winding Waterway . . . because I am pure, the son of a pure one, and I am purified with these four *nemeset*-jars [for the internal organs] of mine which are filled to the brim from the Canal of the God in Iseion [sanctuary of Isis, rather than Osiris, in this context], which possesses the breath of Isis the Great, and Isis the Great dries me as Horus.

“Let him come, for he is pure”: so says the priest of Rē concerning me to the door-keeper of the firmament [these are probably actual words of the ritual], and he announces me to those four gods [the gods of the four *nemeset*-jars, who were “sons of Horus” or “followers of Horus”] who are upon the Canal of Kenzet.<sup>75</sup>

Kenzet, or Kenset, was another of those names that referred to both a real place (in this case in the very far south, the so-called First Nome district) and a mythological locality. It means the Land Beyond. But there is no need to pursue further all these myriad epithets, their use, and their history in Egyptian tradition at this time

One could go on gathering up all these confused threads, or scattered limbs, indefinitely. But the essence of the situation is clear. There was a sacred Lake of the Netherworld called Jackal Lake, which had many other names and fancy descriptions, presided over by Anubis, and it was “winding” and also called a “canal of the god.” It was at Rostau in Giza. It is mentioned in the ancient texts over many centuries, repeatedly. It was the scene of a sacred ritual of the washing of the internal organs of the deceased king in the four jars that contained them, which were submerged into the water at the edge of the lake, as an act of purification to facilitate his resurrection. I suggest that this was all real, not mythological, and that in Old Kingdom times it took place in the Sphinx Moat, which surrounded the great statue of Anubis, which I choose therefore to call Sphinx Island.

Finally, we come to the most specific evidence of all that the Great Sphinx was once an island. This

evidence has been discovered by excavation within the Sphinx Pit itself. In 1817, when Giambattista Caviglia cleared the front of the Sphinx, he cleared its paws of sand for the first time since the collapse of the Roman Empire. And there he found an inscription in Greek carved prominently on the middle toe of the Sphinx's left paw. The inscription was carved with official sanction in the year AD 166, during the reign of the emperor Marcus Aurelius, to commemorate the Roman restoration of the retaining walls that surrounded the Sphinx.<sup>76</sup> It was signed "Arrianos," and it refers to the Sphinx as being an "island (made) of a rock."<sup>77</sup> When this inscription was found, it was wondered whether the Arrian whose name appears at the bottom of the Greek verse might possibly be the same Arrian as the famous historian of that name, who wrote the life of Alexander the Great called *Anabasis of Alexander*. (The Greek word *anabasis* means journey upward, and it was the title the earlier Greek historian Xenophon had given to a famous work of history that he wrote. Arrian was often called in his lifetime the second Xenophon. He paid homage to the original Xenophon by imitating the title of his most famous work.) Although Arrian was a Greek who wrote in Greek, he lived at the time of the Roman Empire, and his honorary Roman name was Flavius Arrianus. He was a personal friend and protégé of the Roman emperor Hadrian (who died AD 138). They met during Hadrian's visit to Athens in AD 126, and Hadrian then took him back to Rome with him and gave him his honorary Roman name personally (Flavius being a forename that could be used only by royal decree), eventually appointing him to be consul of Rome (the highest office under the emperor). Prior to the consulship, in 132 Hadrian had appointed Arrian to be governor of the Roman province of Cappadocia in Asia Minor, where Arrian showed unexpected military prowess and repelled a major barbarian invasion by a fierce and warlike nomadic people called the Alans. Arrian had started life as a peaceful philosopher. He had been a pupil of the famous Stoic philosopher Epictetus (who died circa AD 135), whose chief disciple he was. He published many books of Stoic philosophy based on the discourses of Epictetus and also compiled the famous *Manual* (*Enchiridion* in Greek) of Epictetus's teachings, which is still popular and highly relevant today. Epictetus was like the earlier Socrates in that he wrote nothing. All the works that we have today by Epictetus, which are extensive, were actually written down and systematized by Arrian as a record of his teachings. One of the first seventeenth-century books I ever bought as a young man, and still one of my most precious for both intrinsic worth and sentimental reasons, is George Stanhope's 1694 translation of the Commentary on Epictetus's *Manual* by the Neoplatonic philosopher Simplicius.<sup>78</sup> I pored over this work when I was in my twenties and in my phase of intensively studying both Stoic philosophy and Neoplatonism. As Simplicius says (in seventeenth-century English, in which important nouns were capitalized, as they are today in modern German):

The principal Design of this book (if Men would but suffer themselves to be wrought upon by it, and not think it sufficient to give him the Hearing only, but let it seriously affect their Minds, and would reduce [transform] what they read into Practice) is, To set our Souls as Free, as when their Great Father and Creator first gave them to us, to disengage them from all those slavish Fears and confounding Troubles, and other Corruptions of Humane Nature, which are wont to subdue and tyrannize over them.

It is called an *Enchiridion*, or Manual, because all Persons, who are desirous to live as they ought, should be perfect in this Book, and have it always ready at hand: A Book of as constant and necessary use as the Sword (which commonly went by this name, and from whence the Metaphor seems to be taken) is to a Soldier.

The Discourses are lively and moving, and all but the Stupid and Sottish must needs be affected with them.<sup>79</sup>



Clearly, I had no desire to be among the stupid and sottish, so I took the book very much to heart, absorbing at a very early age the crucial distinction it made between “what is in our power” and “what is not in our power,” which has enabled me to regard countless vicissitudes of life with a greater degree of equanimity than would otherwise have been possible. I cannot recommend the insights of the work highly enough. Arrian, who had such experience of war, both as a commander who repelled the barbarians and as a magnificent historian of Alexander the Great and his military conquests, clearly gave the *Manual* its particular title on purpose, having very much in mind the soldier’s sword as the analogy, as Simplicius points out. One is tempted to hear Arrian humming something like: “Onward Stoic Soldiers, Marching unto War, with the Enchiridion Going on Before ” Certainly, the Christian concept of “the Church militant” owes something to this.

There was no other famous Arrian in antiquity. And so, when one speculates on who would have the prestige and authority to inscribe his words on the toe of the Sphinx on the occasion of a great public and official Roman ceremony, one unhesitatingly concludes that it could only have been the historian Arrian, who was one of the highest-ranking retired dignitaries in the entire Roman Empire. Another point to keep in mind is that the inscription was in Greek (Arrian’s native language), although the official occasion was a Roman one. One can safely conclude that only someone as famous as Arrian would have been allowed to inscribe something in Greek rather than in Latin to celebrate a Roman state occasion.

Arrian was presumably visiting Egypt and would have been invited to compose a celebratory verse as a courtesy by the Roman governor of Egypt at that time. I think we may safely conclude, therefore, that the verses cut into the toe of the Sphinx were written by the famous historian Arrian. By that time, he had been retired from political activities for twenty-eight years and had returned to his hometown of Nicomedia in Bithynia (Asia Minor) and his main residence, though he must have visited Rome and other parts of the empire from time to time. In Nicomedia, he is known to have become a priest of Ceres and Proserpine. Proserpine was a goddess of the underworld, known in Greek as Persephone.<sup>80</sup> Arrian would therefore have had a particular and specific interest in underworld deities in Egypt, as he was a priest of a Greek underworld deity himself. He would thus have been fascinated by Giza as the most famous necropolis of Egypt. As an expert historian with an encyclopedic knowledge of the past, the content of his verses would have special importance, especially with regard to historical tradition and detail. Everything suggests, therefore, that Arrian the historian wrote the verses on the toe of the Sphinx. And to us, these verses are very important. The inscription no longer survives, as the paws of the Sphinx have been covered entirely with modern “restoration stones ” Curse the “restoration”! It obliterates everything! But in 1817, shortly after it was discovered, the inscription was copied down very carefully. In ancient times, Greek was written entirely in capital letters, as lowercase letters had not yet been devised. So we have an engraving of the original inscription in capital Greek letters (reproduced here in figure 6.51), a rendering of it in lowercase (shown in figure 6.52), a translation of it into Latin, and a translation of it into English. All these were published together in the *Quarterly Review*, volume 19, for April and December of 1818, in London in 1819. There are three English translations of this crucial inscription in existence. Here is the English translation of the verses in modern prose as published by Selim Hassan, and possibly adapted or translated by his assistant, Omm Sety (Dorothy Eady): “Thy formidable form is the work of the Immortal Gods. In order to spare the level, harvest-bearing land, they placed you in the midst of your cavity, as a rocky island, from which they had driven back the sand. They placed you as a neighbour to the Pyramids, for our beholding, not like the Sphinx of Thebes, slain by Oedipus, but as a sacred servant of the divine Leto, who vigilantly guards the good, lamented Osiris, the Sacred Guide of the Land of Egypt.”<sup>81</sup>

ΤΟΝ ΔΕΜΑΣ ΕΠΙ ΑΓΥΟΝΤΕΙΣ ΑΝΘΡΩΠΟΥΣ  
 ΥΕΙΣ ΑΜΕΛΟΙΣ ΩΡΗΣ ΠΥΡΙΔΥ ΑΜΑΖΟΜΕΝΗΣ  
 ΣΜΕΣΟΥ ΘΥΓΑΤΡΕΣ ΑΡΟΥΘΑΙΟΙ ΤΡΑΙΕΖΗ  
 ΜΗΝΟΥ ΠΕΓΡΑΙΗΣ ΨΑΜΜΟΚΑΠΟΣ ΑΜΕΝΟΙ  
 ΓΕΙΤΟΝΑ ΠΥΡΑΜΙΔΩΝ ΤΟΙΝΥΘ ΣΣΑΝΣΙ ΟΡΑΣΘΑΙ  
 ΟΥ ΓΗΥ ΟΙΔΑΜΟΣ ΔΕ ΟΤΟΚΤΟΥΘΩΣ ΕΠΙΘΗΣΑ  
 ΙΓ' ΕΙΔΕΘΕ ΑΝΤΟΡ ΠΙΟΣ ΠΟΛΟΧΑΓΝΟΤΑ  
 ΣΤΥΜΙΩΤΗΡΟΥΣ ΑΝ ΠΕΠΟΘΗΜΗ ΚΟΝΕΣ ΔΟΝΟΙ ΤΙΔ  
 ΓΕΙΤΗΝΣΑΙ ΓΥΠΤΙΟΣ ΣΣΕ...ΑΣ ΜΙΘΗΓΗΤΗΡ  
 ...ΥΡΑΝΟΝ ΜΕΙ...ΤΟΝ ΜΙ...  
 ...ΙΚΚΕΛΟΝ ΕΦΑΙΣΙΩ...  
 ...ΣΙΟΤΑΝ ΟΚΕΜΟΚΣΙ...  
 ...ΓΑΙΑΝ ΣΗΥΡΩ...  
 ΑΡΡΙΑΝΟΣ

Figure 6.72 This is the Greek inscription on the left paw of the Sphinx, dating from the official Roman commemorative ceremony of AD 166, as it was published in 1819 in the *Quarterly Review*. The copy was apparently made by Henry Salt in 1817 at the time of Caviglia's excavation.

Σαν δεμας Ιαπαλλον τεύξαν θεοι αλλε ζωντες,  
 Φειδαμνοσι χειρησ πυριδα μαζομενυς  
 Ες ρισσι μηδαναντες αρουρακιο τρατέζης,  
 Χησιν πυραμυδης ψαμμοκασαμμενοι  
 Γείτονα πυραμυδων επαν θείων ειοσασσθαι,  
 Οδ εην Οιδιποδαο βροταπτόνον, ες επε θάρβας,  
 Τη δε θα Αηται προσπλουον αητοπύην,  
 [Εδ μάλα, εχεσσαν πεποδημένα ελθάν εσθλόν άναντα,  
 Γουης Αιγυπτιοιο πιδασμην ηητήρησ,  
 Ούρανιον μέγασ αντομίδωτα, [δεονσω όμαμασ,  
 Ηέκτου 'Ηφαιστου, μεγαλήτησα, [βρομασσητα  
 ]'Αλλεμον εν πολίμω, και εράσμιω εν πολήηταις]  
 Γαίαν άδερσθαι [πασσαι δαλίαισιν κίλοντα].

Figure 6.73 This is the transcription of the Sphinx inscription into lowercase Greek such as is used by modern scholars, published in the *Quarterly Review* in 1819. This transcription and effort to fill in the gaps was done by a classicist named Dr Young. The first two words in line four speak of the Sphinx as an “island of a rock.”

It is necessary to point out that the reference to the Greek goddess Leto is merely a polite reference to the region in which the Sphinx lies. The name given to it in Greek by the Ptolemies was the Letopolitan Nome (a *nome* being an administrative district). The Sphinx is thus called a “servant of Leto” only because the Sphinx sits in the administrative district named after Leto. This is a flowery bit of “officialese,” because it is a formal state occasion.

Here is the earlier translation by Dr. Young into rhyming verse, which was published 1819, where Leto is called by her Latin name of Latona:

*Thy form stupendous here the gods have placed,  
 Sparing each spot of harvest-bearing land;  
 And with this mighty work of art have graced  
 A rocky isle, encumber'd once with sand;  
 And near the pyramids have bid thee stand:  
 Not that fierce Sphinx that Thebes erewhile laid waste,*

*But great Latona's servant mild and bland;  
Watching that prince beloved who fills the throne  
Of Egypt's plains, and calls the Nile his own.  
That heavenly monarch [who his foes defies],  
Like Vulcan powerful [and Pallas wise].*

ARRIAN<sup>82</sup>

It is a pity that the bottom lines of the inscription were not preserved properly, although Arrian's signature at the bottom is perfectly clear (see figure 6.50 for the reproduction of the original inscription, where *arrianos*, the Greek form of Arrian, is written as *arrianoc*, because the final *s* tended to be written like that in inscriptions in those days). Dr. Young has not hesitated to fill in some missing bits in square brackets and otherwise, reading understandably *ouranon* where the initial *o* is lacking and only *-uranon* survives (hence the appearance of "heavenly" in his tenth line of verse), but he has not attempted to reconstruct the last two lines at all, even though fragments can be seen. He also omits the name of Oedipus. The last line appears to mention either *gaia*, "the Earth," or Gaia, the Earth goddess of the Greeks, but interpreting the orthography of ancient Greek inscriptions is a highly specialized skill that I lack entirely. The way the words run together and are not separated in these ancient texts is maddening and reminds me of the nightmare of my youthful days in dealing with this phenomenon as a student of Sanskrit (though in Sanskrit, the letters perversely "melt" and change into a new form when run together, as if designed to drive a student truly insane with frustration). However, on a have-a-go basis, I would say that I do not see the name of Thebes in the inscription following the mention of Oedipus in this inscription as published in 1819, or the mention of Osiris by name in the inscription either. However, the "island (made) of a rock" is very much there, at the beginning of line four, followed by *psammon*, the word for sand.

The Greek inscription was published again later, after some tidying up by a Reverend Coleridge of Eton, who was a classicist. This appeared in the appendix volume of *Operations Carried On at the Pyramids of Gizeh* by Colonel Howard Vyse and John Perring, London, 1842.<sup>83</sup> I reproduce this rather different version of the Greek inscription as figure 6.74. In this version, we can see that the name of Greek Thebes does indeed appear (as the last word of line six), whereas the word had been incorrectly transcribed in the version printed in 1819, with the *b* being written as a sigma, so Thebes could not be made out. In this version, the name of Osiris does also appear at the end of line eight (*oceirin*). Here is the translation done by Coleridge (who added "The Salutation of " in the last line himself):

*The ever-living gods built thy . . . form,  
Sparing the ground producing corn,  
Having raised thee in the midst of the arable land,  
Having driven back the sand from the rocky island;  
A neighbour of the Pyramids they placed thee;  
(A line seems wanting) . . . such to behold,  
Not the slayer of Oedipus, as at Thebes,  
But the goddess Latona, a most pure attendant,  
protecting the regretted good Osiris  
the revered governor of Egypt,*



heavenly, great,  
like to Vulcan,  
the earth.

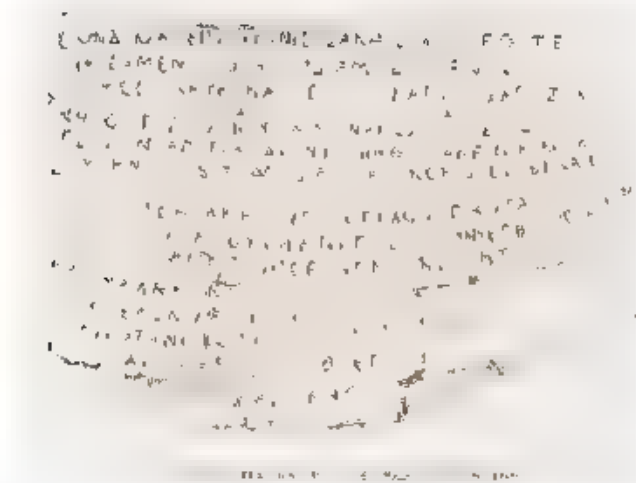


Figure 6.74 This is a second attempt to publish the inscription on the left paw of the Sphinx, an “improved version” prepared by the Reverend Coleridge of Eton. In this version, many of the words are clearer than in the version printed in 1819 and shown in figure 6.72. The name of Arrian, author of the verses, may be seen at the bottom (in Greek the letter that looks like a P is really an R). The name of Thebes is the last six letters of line six. The name of Osiris is the last seven letters of line eight. The first two words in line four speak of the Sphinx as an “island of a rock.” This was published by Colonel Howard Vyse in 1842. Some of the inscription seems to have been lost since the excavation in 1817, possibly because the surface of the stone peeled, but other words are now clearer than in the previously published version.

If we examine what is said in this inscription, despite its incomplete state, we find that we are told (a) that the Sphinx is placed in a cavity, by which is meant the Sphinx Pit (although this does not come across in Coleridge’s translation), (b) that the Sphinx is an island made of a rock; (c) that the sand has been driven back from the pit and from the Sphinx (held back by the retaining walls, which this inscription commemorates), (d) that the Sphinx is a neighbor of the pyramids, and (e) that the Sphinx stands guard over “the good, lamented,” or “regretted good,” Osiris.

What is important to us is that the Sphinx is described as an island made of a rock. The Greek adjective describing the island is *petraios*. This is a word that has the meaning “of a rock.” It is not strictly accurate to translate it as “rocky,” as if one were referring to lots of rocks, although the word was used that way sometimes. But there were other related words such as *petrinos* that were more commonly used to mean “rocky.” This particular word was presumably chosen because it was recognized that the Sphinx was a *single* rock. And as this single rock was purposefully described in AD 166 on a state occasion by the scholarly historian Arrian as being “an island,” I rest my case.

## THE SPHINX AND THE GIZA PLAN

The mysterious plan of the Plateau of Giza will be described later on in this chapter, and is illustrated in figure 7.25. It is one of the most fantastic survivals of ancient Egypt, in some ways more remarkable than the monuments themselves, since it actually embodies them within a larger scheme so complex and ingenious that it reminds me of a modern computer program run amok. And it is a plan not only in two dimensions, but in three as well. We shall see that the Sphinx and the Giza pyramids have a precise and direct relation with one another, a relation so specific that the monuments mutually determine one another's positions on the plateau. They form a unified complex. There are numerous correlations, and one may be seen in figure 7.2, which is a detail of the intriguing figure 7.1 and shows the Sphinx from the top of the Great Pyramid. If we look from that point, a line seems to cross the Sphinx's head and become a diagonal through the Valley Temple from its northwestern corner to its southeastern corner, perhaps touching the northwest corner of the Sphinx Temple in the process. I have chosen not to represent this in figure 7.25, which details what I call the Golden Giza Plan, because if this line is intentional and not fortuitous, it appears to represent a correlation that is additional to the "system" of the golden angles, which it is my main purpose to make clear to readers.

It is the Golden Giza Plan in figure 7.25 that proves the main Giza monuments were constructed to a unified plan. The size, position, and general shape of the Sphinx are determined by sighting lines (or "rays," as I like to call them) from the pyramids, which all are generated by the use of a single angle, the sacred angle on which the whole of ancient Egyptian art and sacred and royal architecture were based for religious reasons.



Figure 7 1. A stereoview photo from the top of the Great Pyramid, looking southeast toward the Sphinx, which is in the top right corner, unfortunately covered in shade from a passing cloud. See the detail of it in figure 7 2. In this photo, one gets an impression of the dizzying height of the pyramid, more than 500 feet up in the air with the birds. No place for a person with vertigo! This photo was probably taken in the late 1930s, as the excavated Sphinx Temple is at the feet of the Sphinx. The modern access road to the



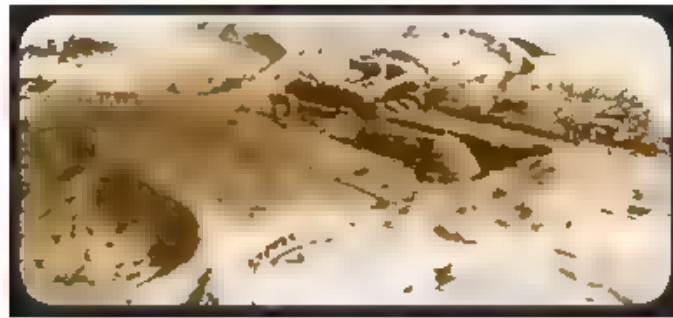


Figure 7.2 This detail of the previous photo shows how the center of the head of the Sphinx is in line with the diagonal joining the northwest and southeast corners of the Valley Temple, as seen from the top of the Great Pyramid (*Collection of Robert Temple*)

But before we come to that, we must consider some ancient Egyptian texts that seem to describe some of the mysteries and design of Giza. The ultimate answers to the mysteries of the geometrical plan of Giza are deeply connected with the most bizarre complex of mythological concepts dealing with death and resurrection. And at the most fundamental level, this all emanated from a single idea: the profound conviction that the universe was based on what the Egyptians called *Maât*, or Cosmic Order. Most people think that the Egyptian religious beliefs were spread across many gods and were diffuse and unfocused as a result. It is true that they had many gods, but they had only one Cosmic Order. In that sense, they were more profoundly monotheist than any people since. Ultimately, what they really worshipped was One Principle, with their many gods arranged like so many flowers around its altar of perfection. However, we shall see what comes out of a closer examination of why anyone would construct anything quite so weird as the Giza necropolis; and for the first time for thousands of years, its geometrical plan will become as plain as it was to those who constructed it in the first place.

There are some very strange ancient texts indeed that we must now consider. These are of a different category than the Pyramid Texts from Saqqara that we examined in the chapter on the Sphinx as Anubis. These texts are preserved both in the form of papyri and as sacred Coffin Texts of the Middle Kingdom, and as wall texts in royal tombs of the New Kingdom. The texts were considered so special that they were supposed to be used only by the deceased kings, although a few nobles did so also. Although the wall texts are known only from the period of the New Kingdom, commencing with the Eighteenth Dynasty (circa 1540 BC), they are believed by Egyptologists to be very much older and to have been “recycled” in the New Kingdom. They are thought to date from the Old Kingdom, the Pyramid Age, circa 2700–2200 BC, when Giza was central to the concerns of all the priests and scribes of Egypt. By the time of the New Kingdom, when the capital of Egypt was at Thebes in the south (a town now called Luxor), Giza was no longer central to Egyptian civilization, pharaohs were not building their tombs there, and certainly they were not building any pyramids there. The pharaohs by that time were all being buried in the famous Valley of the Kings across the river from Thebes (Luxor). As we know from the inscription on the Dream Stela erected in front of the Sphinx by the New Kingdom pharaoh Thutmose (Thothmes) IV, who excavated the Sphinx at Giza as a result of his dream, until then Giza had been a place where one went hunting on horseback and dozed in the shade afforded by the head of the Sphinx, as that and the top of the back were the only portions of that monument that still protruded from the sand. (I assume the top of the back was visible, for otherwise Thutmose would not have known that the body was buried by sand, as there would have been no evidence of a body’s existence.) Giza was essentially deserted. The New Kingdom pharaohs erected a few pathetic little temples there (less impressive, I must say, than many eighteenth-century English garden monuments and decorative mock temples in places such as Buckinghamshire) to show their reverence for the ancient sacred place, but otherwise Giza was of little

concern to them (see figures 7.3 to 7.5). This changed to a certain extent after the Sphinx was cleared and it became the center of a minor cult, with an altar for offerings to the spirit of the Sphinx. No one remembered that it had once been Anubis. It was accepted at face value, as a monument with a pharaoh's face (no one would have remembered which one) and an animal body that from that time onward came to be thought of as a lion. In other words, people of the new Kingdom were as ignorant of the body being that of a dog as modern people are.



Figure 7.3. This interior doorway of the small New Kingdom Temple of Amenhotep II at the northeastern corner of the Sphinx Pit has been constructed in such a way that it is in perfect alignment with the Great Pyramid, whose apex is aligned with the center of the doorway and lintel. The view is toward the northwest. The wall beyond the temple, where some people are, is the foundation and border wall of the modern access road from Nazlet el-Samman to the pyramids. It was constructed some time after the Second World War. The siting of this temple in such an obvious way to align with the apex of the Great Pyramid reminds us of the relationship of the apex of the Pyramid of Chephren with the floor of the Sphinx Temple (that sight line is at the golden angle, as measured with an inclinometer), and also the general Giza Plan, as it specifies the precise size and location of the Sphinx with relation to the two main pyramids, as described in the text. (Photo by Robert Temple)

The New Kingdom pharaohs could not manage to build pyramids anymore through loss of the techniques and skills of their predecessors, and they put their efforts into temples and obelisks instead. The Pyramid Age had well and truly passed. Therefore, when pharaohs and nobles of that time used sacred texts referring to Giza and its lore, these were drawn from papyri that preserved the texts from an earlier era. Egyptian religious practice was always highly conservative, and texts were recycled over the centuries. This is true in modern Christianity as well. In church, people still say the Lord's Prayer, which was a prayer said to have been spoken by Jeschu (more commonly known by the Latin form of his name as Jesus) the Nazarene two thousand years ago. No one feels uncomfortable about this. Although new translations have been made, no one says "This prayer is no good, it's too old, let's throw it out and get a new one." It retains its validity, its importance, and its relevance even in the twenty-first century. Of course, it has been expanded since the time of Jesus. It now says at the end: "For thine is the Kingdom, the power, and the glory, forever and ever, Amen." Jesus never said any of that. His original prayer ended with the words: "and deliver us from evil." Clerics cannot resist tinkering and trying to improve things. Sometimes the Lord's Prayer is said without the extra bits, in its pure form, but there seems to be no pattern determining when it will be said in its pure form and when it will be said in its expanded form. Jews do not complain when rabbis read the Torah, which is hundreds of years older than the Lord's Prayer. Muslims do not complain when someone reads from the Koran, even though it was written in the seventh century. What Hindu has ever complained about his priests, the brahmins, reciting passages from their earliest sacred texts, the Vedas, which are 3,500 years old, even though they are in Sanskrit, a

language that only a handful of scholars can any longer understand? (I studied Sanskrit at university, and I can assure you that it is one of the most difficult subjects of study you can possibly imagine, and no wonder no one can understand it anymore, as it has the most complicated grammar of any language in the history of the world. It was by far the most difficult thing I ever had to learn.) So it should not surprise us, therefore, based on what we know of modern religions, to discover that the New Kingdom Egyptians were also using texts that were many hundreds of years old, or even as much as 1,200 years old. After all, most of these texts were not nearly as old for them as the Lord's Prayer is for us now, and were less than half the age the Torah is today. But also, as with the Lord's Prayer, they could not resist tinkering sometimes, and adding some bits. People are always fidgeting, tinkering and fiddling with things if only out of nerves.



Figure 7.4. A photo, facing southwest, of the author standing in the doorway of the small New Kingdom Temple of Amenhotep II, overlooking the northeastern portion of the Sphinx. The center of the lintel of the doorway is aligned with the center of the Sphinx's forehead at the top of its head, which was one of the artistic canonical measuring points in traditional Egyptian art. (Photo by Olivia Temple)



Figure 7.5 This photo taken in 1951 by Selim Hassan shows the small New Kingdom Temple of Amenhotep II situated in front of the Sphinx, at an angle and to the left. The temple was excavated by Hassan in the mid-1930s. Since this photo was taken, the authorities have raised some of the fallen stones and reconstructed much of the structure, which was not particularly difficult to do, I suspect. This photo was reproduced very poorly in Hassan's book, *The Great Sphinx and Its Secrets*, Cairo, 1953, as figure 34 on page 47. However, I bought the original print from a dealer and have therefore been able to reproduce it at last with proper definition in a digital scan and by modern printing. (Collection of Robert Temple)

There are many surviving ancient Egyptian texts dealing with the afterlife and the netherworld, the best known being the so-called *Book of the Dead*. However, this name *Book of the Dead* is unfortunate, since it is not a real title. It is merely a survival of the name given to a variety of afterlife spells written on papyri that were found in coffins by grave robbers. When the robbers came across these writings, which of course they were unable to read, they merely referred to them collectively as "books of the dead," that is, books belonging to the dead men and women whose mummies they were robbing. The *Book*



of the *Dead* was thus never a book, and there are many different collections of chapters and spells gathered together in different combinations that have come to be known under this general designation. Some portions of this material did have a kind of unity to them; for instance, the title of one genuinely ancient part of the material was *The Book of Coming Forth by Day*. (This refers to the resurrection of the dead.) But one should keep in mind that there is no actual Egyptian *Book of the Dead* as such. This is quite different from the situation in Tibet, where there is another work called *The Book of the Dead* (first committed to writing in the eighth century AD), which is a unified text about the experiences of the deceased soul, together with instructions to be shouted into the ear of the dead person to help him or her navigate the difficult realms of the afterlife.<sup>1</sup> Needless to say, there is absolutely no direct connection of any kind between the Tibetan *Book of the Dead* and the Egyptian texts grouped under the misnomer *The Book of the Dead*. However, the title “Book of the Dead” is considered so evocative and is at the same time so simple and so easily grasped that many members of the public who know little more than the title are inclined to think they know what it is, which merely adds to the confusion. The title has the illusory sense of completeness of a well-edited television sound bite and can lead people astray just as easily

There are some portions of the *Book of the Dead* material that appear to refer to Giza. But the most important texts about Giza are two sections of the earliest actual “book” of the underworld, which is now known as *The Book of the Am-Duat*, or *The Book of What Is in the Netherworld*. This was not its original title. In the text itself, its original title is given as *Book of the Hidden Chamber*.<sup>2</sup>

Since hidden chambers are an important theme for us, and the subject of an entire earlier chapter of this book, the title is certainly intriguing. I am inclined to view the *Book of the Am-Duat* as a work of the New Kingdom into which has been inserted a section, which is based on an ancient papyrus of the Old Kingdom that the later priests still possessed and decided to incorporate, although it didn’t really fit. Many scholars have thought this, so it is not a new idea. There is a clear discontinuity in the text. For most of the *Book of the Am-Duat*, the sun is traveling across water in his boat at night through different gates and regions of the underworld, where he encounters a variety of gods and monsters. Each of the twelve regions of the underworld is called an “hour,” and they are passed through in succession. However, the fourth and fifth hours are quite unlike the other hours, so much so that the sun god even has to leave his boat and travel across sand. It is at this point that he is in the realm of the hawk-headed god Sokar, also spelled Sokaris or Seker. And there seems to be agreement among the authorities that this refers to the necropolis of Giza.

I think *Book of the Hidden Chamber* is probably the original title of the earlier work that contained these two chapters, especially as the section of the fourth and fifth hours refers to hidden chambers. There are various depictions of hidden chambers in the ancient netherworld illustrations, and one of the best is from the left wall of Sarcophagus Hall I in the tomb of Rameses VI (see figure 7.7). The Hidden Chamber was generally inhabited by the deceased Osiris awaiting resurrection. Sometimes it was inhabited by the god of the resurrect-able aspects of the netherworld, Sokar, which may go back to the earlier tradition before Osiris became amalgamated with Sokar. (Sokar had no connection with the damned, who were given over to torture and eventual destruction in the Place of Annihilation, tasks that were the jobs of others.) I suspect that the title *Book of the Hidden Chamber* later came to be applied to the New Kingdom Am-Duat book as a whole, carried over from the earlier text of the two chapters that were preserved in something approaching their original form.

The weird contents of this section of the fourth and fifth hours must be studied with some attention, as certain clues seem to be found there that may assist us in considering the Giza Plateau. It should be noted also that a clear illustration of a pyramid is to be found in this section (see figures 7.6 and 7.7).

Wallis Budge as long ago as 1904 realized that the fourth and fifth hours were an insertion into the larger book and once consisted of a self-contained underworld of their own. In *The Gods of the Egyptians*, he wrote: "The domain of Seker [Budge always spells Sokar in the form Seker], although reduced to two hours which have been inserted in their proper geographical position in the [Underworld], certainly at one time formed a complete hell, and . . . the rising of the sun was the final event which took place in it."<sup>3</sup>

This domain of Sokar, identified with Giza, was also known as Rostau. But like all Egyptian names, Rostau can be spelled in various ways, as we have already seen earlier in this book. Budge spells it Restau. It was also occasionally called Restatet. Some Egyptologists prefer Rosetau and others use the form Ro-Setawe. This name, which we shall continue to spell Rostau, seems to refer specifically to the underground region at Giza. But it was also by extension sometimes the ancient name for the Giza Plateau as a whole (as separate from Djedu, later known in Greek as Busiris, which was the adjoining village to the east). The translated meaning of the name is Mouth of the Passages<sup>4</sup> or, in other words, Entrance to the Passages. And the passages meant are, obviously, the secret passages of the Giza Plateau, both those underground and, by extension, those concealed within the pyramids.



Figure 7.6. This carving of the god Sokar is found on a wall in the most mysterious and esoteric of all the underground crypts beneath the Temple of Denderah in Upper Egypt, where strange rituals or initiations are believed to have taken place. The crypt is known as Chamber C of the North Crypts. Sokar's name in hieroglyphics is in the small rectangle beside his head. See the drawing of this wall in figure 8.25. Sokar was often portrayed as a hawk or a mummified hawk (not to be confused with the god Horus, who was also portrayed as a hawk, but never mummified). Sokar presided over the world of the dead and was an entirely subterranean divinity who never came to the surface. The modern name of Saqqara derives from the name Sokar, because of its many subterranean passages and chambers and its proximity to Giza. Sokar's actual home was said to be at Rostau, or Rosetau, which was described as being at the foot of the Giza Plateau, at the same location as the Sphinx, just west of the village that in Greek times was called Busiris but is today called Nazlet el-Samman. It was there that Sokar had a temple of his own, believed to be what is today called the Valley Temple of Chephren, a huge, gloomy structure made of megalithic blocks of granite. Sokar was the Old Kingdom's underground god and was intimately associated with the dog Anubis, who was the surface guardian of the necropolis and of the dead. They were the predecessors of the later god Osiris, who from the time of the Fifth and Sixth Dynasties usurped both their functions and became the King of the Underworld. From then on, the humanized Sokar, under the name of Osiris, could be successively identified with every dead king, who after death was said to "become an Osiris." A mummiform version of Sokar carried in a sacred barque is shown in figure 7.22, an engraving from circa 1798 of a carving that is now believed to have been lost or destroyed. In the Old Kingdom, there was an annual Festival of Sokar at Giza, when this image of Sokar sitting in a celestial boat was carried around by the priests as part of an itinerant celebration. (Photo by Robert Temple)

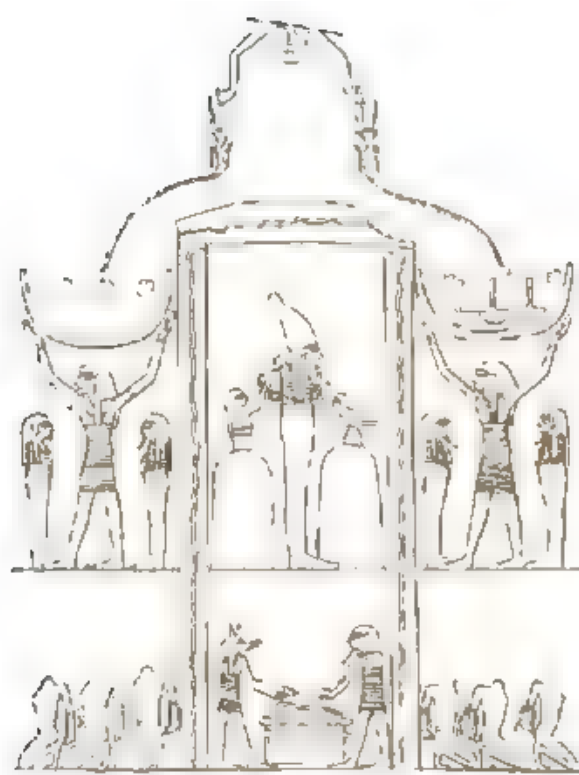


Figure 7.7 This evocative depiction of a hidden chamber in the netherworld shows a chamber with two stories. On the top story, Osiris is standing as a mummy, wearing the crown of Upper Egypt. In front of him, his own ba (spiritual force), called in the text "the Soul of Osiris in the West," is worshipping him and standing on a mound, while the Earth god Geb arises from a mound behind him, also in a posture of adoration. In the lower story, the god Anubis and another figure, probably the Earth god Geb but called in the text "the One over the Mysteries," preside over a chest called in the text "the mysterious chest." This chest contains the secret of secrets, the thing most carefully guarded of all, and no one is allowed to know what it is. To the right and left of the bottom story are kneeling figures of the evil dead, their hands bound behind their backs in the posture of captives, who have been decapitated as the first stage of their annihilation. To the right and left of the hidden chamber are vertical Nehep serpents standing on their tails, signifying resurrection. The cauldrons being held aloft on either side in the top register hold, on the left, hearts, and on the right, a mixture of hearts and upsidedown soul-shadows (all the dead were believed to enter the netherworld upside down). The hearts and soul shadows are pouring from the streams of blood of upside-down decapitated corpses who are being lowered from the sky. (From Alexandre Piankoff, *The Tomb of Rameses VI*, Pantheon Books, New York, 1954, figure 110 on p. 357)

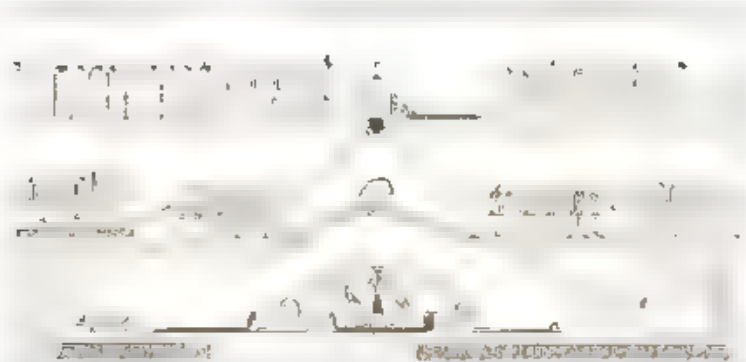


Figure 7.8 This section view image of a pyramid is found in the fifth hour of *The Book of the Hidden Chamber*. Directly beneath it, the subterranean god Sokar with his falcon head is seen rising, opening a pair of wings, from the body of a serpent within an ellipse of sand. In the text he is called "the Great God who opens his two wings, He of the Dappled Plumage." What he does is to guard his image. The text describes the sandy ellipse as "the mysterious cavern of Sokars, He Who Is on His Sand." It is also known as the Cavern of the Hidden One. To either side of Sokar are the two heads of Aker, an underworld guardian deity. To the far right, a Nehep serpent leaps up above a star, indicating resurrection. The tip of the pyramid is a human head facing east, which is to the right in this picture. Above this head, the solar barge, known as Life of Power, is being towed across the sand by a rope that passes through the hands of Khepri, the beetle who assists the rising of the sun (see also the discussion of Khepri in the text). The text states, "The towrope which you have brought, the towrope is lifted by Khepri that he may help Re, that he may make straight the mysterious ways of Re, Horus of the Horizon." As the sun god passes the cavern of Sokar, the sun calls out to him: "Guard this thy image, O Sokars, He who hides the mystery. I call thee, my words to thee are thy illumination, thou rejoicest hearing them." The substitution of a human head for the pyramidion tip of the pyramid is highly suggestive, indicating that the pyramids of Giza may have been conceived of as expectantly awaiting the rising sun to give his flash from their sheets of gold.



The head is also a hieroglyph, meaning *tep*, which not surprisingly has the basic meaning of “head,” but also means “the top.”

The visual pun suggests that the top of a pyramid may have been known to the ancient Egyptians as its head. A photo of the same scene in the Tomb of Rameses VI is seen in figure 7.9. (From Alexandre Piankoff, *The Tomb of Rameses VI*, Pantheon Books, New York, 1954, figure 78 on p. 261)

I believe that there were also other “passages,” laid out on “the sand of Sokar,” namely the sand of the Giza Plateau itself, and that these were the invisible “rays” of the geometrical design shown in figure 7.25. However, our discussion of the rays and their significance comes later.

*The Book of the Hidden Chamber* (for that is how I intend to refer to it from now on, as this is its true ancient title) commences its description of Giza with a picture of a descending passage beside which stands the goddess Neith wearing the Crown of the North. (The crown, the goddess, and North all have the same name in Egyptian, *net*. Neith is the Greek form of the name used by scholars, just as they generally call Khafre by the Greek form of his name, Chephren, etc.) It seems reasonable to assume, therefore, that this picture refers symbolically to a northern entrance. Because the three main pyramids at Giza all have descending passages with northern entrances, and since the description is meant to be of Giza, it does not seem to be stretching a point to conclude that at least the commencement of the strange illustrations of “the passages of Rostau” in *The Book of the Hidden Chamber* begin with that simplest of things, the entrance to a major pyramid. Presumably the Great Pyramid was intended. It is most unlikely to be a coincidence that the entrance to Rostau is shown in the papyri and the wall paintings to be “northern,” when it was the north faces of all the main pyramids at Giza that “led into Rostau.”



Figure 7.9. This is plate 86 from volume II *Plates* of Alexandre Piankoff and N. Rambova, *The Tomb of Rameses VI*, Bollingen Series XL.1 (New York: Pantheon Books, 1954), photos by L. F. Husson. This image is from the left wall of Corridor G in the tomb and illustrates the fifth division of the ancient text called *The Book of What Is in the Netherworld*. The introductory text states: This Great God [the Sun] is towed along the right ways of the netherworld on the upper half of the mysterious Cavern of Sokaris. He on His Sand, invisible and imperceptible—to make the mysterious arrangements in the land which carries this divine flesh. The name of the Gate of this City is Stop of the Gods. The name of the Cavern of this god is the Hidden One. It is done according to the plan which is drawn in the hidden region of the Netherworld in the South of the Hidden Chamber. He who knows it, his soul will be at peace, he will rest as Sokaris rests. (Translation by Piankoff in his volume I, p. 262)

In the center, a pyramidal mound is portrayed, topped by a head, above which the scarab beetle is rising, symbolizing the rising sun. Beneath the pyramid, in his subterranean elliptical chamber called the Hidden One, the god of the dead, Sokaris, rises, with his wings of resurrection expanding to either side of him. His cavern is guarded on either side by Aker, the double-headed protector deity of the netherworld, with face and paws facing each way. The text says of the mound that it is the “Flesh of Sokaris. He on His Sand” and then adds: “The image is like this in thick darkness. The egg which belongs to this god is lighted up by the eyes in the heads of this Great God [Aker], his flesh shines, the legs are inside in coils. The Great God keeps guard over this image. The noise is heard in the egg, after the Great God has passed by it, like the sound of roaring in the sky during a storm” (p. 267, Piankoff). In the middle register, various gods are towing the rope of the solar barque, dragging it across the sands of Giza, for that is the location of the secret chamber of Sokaris, which was said to be beside the Sphinx at Rostau. (Photo copyright © 1954 by the Bollingen Foundation)

Figure 8.6 is a photo I took of this entrance scene as it was painted on the walls of the Tomb of Rameses III in the Valley of the Kings. I don't believe the Rameses III version has ever been reproduced before, and it does not appear in any of the relevant books. Nor does Erik Hornung in his survey of Egyptian netherworld literature mention more than in passing the existence of a Rameses III version of *The Book of the Hidden Chamber*.<sup>5</sup> This Rameses III version is a particularly vivid painting, as you can see.

Once we get past the entrance, however, things start to go awry with the tomb paintings and the papyri, and we quickly realize that however many interesting and even authentic details may be shown or hinted at in these pictures of the passages of Rostau, we do not by any means have a map or a straightforward plot of the existing structures and passages. Some curious features can be interpreted as accurate, still others are merely suggestive. But there is no attempt whatsoever to present a physically reliable depiction. It is doubtful if, by the time of the New Kingdom, anyone had the faintest idea of what really lay beneath the Giza Plateau or within the major pyramids. And it is not improbable that the ancient text, when it was reprocessed for inclusion in the New Kingdom text, had many of its truly ancient details removed by the unsuspecting adapters, and that tinkering and adjustments were made to fit the passages of sandy Rostau into the underworld journey of the sun god, which otherwise took place over water.

A Netherworld Text that is Middle Kingdom in date, *The Book of the Two Ways*, also preserves some interesting information about Rostau, which it mentions frequently. This text is preserved only as paintings inside a few Eleventh and Twelfth Dynasty wooden coffins excavated at a single site, El-Bersheh in Middle Egypt. If these graves had not been found and the coffins excavated, we would not have the text at all. A complete translation was done by Alexandre Piankoff and published in 1974.<sup>6</sup> Piankoff prefers the spelling Rosetau, which is therefore how the name appears in the quotations that I take from his translation.

The pictures painted in the coffins depicting Rostau are very crude compared to those illustrating *The Book of the Hidden Chamber*. But both agree in having the journey into the netherworld commence with a simple descending passage. In the case of *The Book of the Two Ways*, however, there is no goddess with the Crown of the North or any other indication of a cardinal point. The figure awaiting the unwary person entering the passage is a strange human-headed beast with no legs and a single arm holding a very large and threatening knife. The hieroglyphics state that the name of this creature is Voice-of-Misery, and he is the guardian of the entrance, which is known as the Gate of Darkness. As for the entrance passageway itself, we are told of it: "This way [leads] to the cities of Those-Who-Live-on-the Baboons (?) [the baboon was the symbol of the god Thoth, but baboons were also guardians of the netherworld's Lake of Fire and are frequently depicted sitting around it in illustrations accompanying *Book of the Dead* texts] . . . the cities of the Roaring Knives. This is its way from below. Do not go by it."<sup>7</sup>

In front of the entrance to Rostau is the text that says:

I have passed by the roads of Rosetau by water and on land; these roads are those of Osiris; they are in the sky. If a man knows the Spell for going down into them, he will be like a god directed by the followers of Thoth. He will indeed go down to every heaven to which he desires to descend. But if he knows not this Spell for passing on these roads, he will fall a prey to the tribunal of the dead, his destiny being that of one who has nothing, and is without (his) justification eternally.<sup>8</sup>

Although the surface of Giza is now as dry as a bone, in the times of the Egyptian Old Kingdom and possibly the Middle Kingdom as well (until perhaps as late as 2200 or even 2000 BC), a harbor lapped



against the eastern walls of the Sphinx Temple and the Valley Temple, as I have already explained at length. It is doubtful that this harbor contained water all year long, but it certainly did during the period of the inundation of the Nile. And as I have already explained in detail, I believe that the Sphinx during these times sat in a deep moat of water that was fed from the adjoining harbor. After the water of the inundation receded, the water was trapped in the Sphinx Moat by the sluices, although as the months wore on, it would have become increasingly stagnant and lower in level from evaporation in the heat, hence the need for the previously mentioned drain to bring water from any rain that might occur down into the moat. During the New Kingdom, the pharaohs of that period landscaped and adapted the area for their small and unimpressive temples. There is still to this day a great deal of water underneath the Giza Plateau, as I have seen with my own eyes and photographed in the so-called Tomb of Osiris in the deep shaft beneath the Chephren Causeway, a site that I have studied in great detail, and my report concerning which can be found in *Egyptian Dawn*. In that book, my photo shows the miniature Osiris Island surrounded by a channel of water, with a sarcophagus in the middle (symbolic of a “tomb of Osiris”), more than 150 feet below the surface, which is reached by a succession of three shafts. Figure 7.10 shows the canal and water in the bottom level of the Osiris shaft.



Figure 7.10 This is a photo I took at the bottom of the Osiris Shaft at Giza, approximately 150 feet below the surface, in the third level. The shaft is entered beneath the Chephren Causeway. The central portion of the third level is an “Osiris Island” containing a sarcophagus. It is surrounded by this canal cut out of the bedrock and filled with water. This particular section of the canal is west of the central island. The southern wall of the chamber is at the rear of the photo. The water is covered with an opaque scum but is clear underneath if that is brushed aside. The Osiris Island at the bottom of this shaft portrays the same mythological setting as does the Osireion at Abydos in Upper Egypt. Speculations that this island and canal are of Saite date are false, and the true date is much earlier. (Photo by Robert Temple)

There is even water inside the Great Pyramid, for the “grotto” of the “well shaft” in that structure seems to be continually wet, even though there is strangely no water to be found at much lower levels, and not a drop is to be found within the Subterranean Chamber, the lowest point of all. We should keep all these things in mind when we read the ancient texts such as the above about the “roads by water and on land” at Rostau/Giza. Despite the desert and sandy conditions of Giza, water was always near at hand.

There is a curious part of the coffin pictures (see figure 7.11) showing four successive levels of what

appear to be angled stone slabs blocking the way. The accompanying hieroglyphic text appropriately says of them, "Flame. Spell concerning the roads of Rosetau. These ways lead astray in this manner: each one among them meets the next and leads astray. He who knows it will find their roads. They have high walls of flint in Rosetau upon water and upon land."



Figure 7 11. This is a detail of a drawing of the illustrated text of *The Book of Two Ways*, preserved on the lid of a coffin of Middle Kingdom date numbered CGC 28083 in the Egyptian Museum at Cairo. The large foldout drawing from which this small detail is taken is at the back of the volume *The Wandering of the Soul: Egyptian Religious Texts and Representations*, vol. 6, by Alexandre Piankoff and Helen Jacquet-Gordon, Bollingen Series XL 6 (Princeton, N.J.: Princeton University Press, 1974). The numbers 43 and 44 appearing at the top of the drawing were added by the modern artist to refer to the Coffin Texts relating to those places (Spells 1072 and 1073, respectively). These texts refer to the "high walls of flint in Rosetau" and "the Kneeling Ones with mysterious faces," which I believe refer to movable slabs that block passages. I believe these slabs may be pictorially represented here, on four successive tunnel levels.

"Flint" must be a mineralogical mistranslation, though the original Egyptian word is not given and it is not possible for me to give an alternative stone on the basis of what is published; however, Egyptologists are always getting their stones and minerals wrong, as I have many times discovered, working as I have done with stones and minerals in Egypt as part of our official researches there. There are three Egyptian words thought to mean flint, *ār*, *beshu*, and *desh*, but which is the word used in the text I do not know. Probably it was the mysterious word *desh*, which was specifically said to be black, was connected with magic, and was a "stuff of a decan," meaning a material associated with a division of the sky and the stars of that division. I find it difficult to believe that the real meaning of *desh* is "flint." But then, who am I, a mere mortal, to challenge the all-wise in such matters? Turning to the expert J. R. Harris for enlightenment, I find that all the experts are in confusion where references to "flint" are concerned, and especially regarding the confusing uses of the Egyptian word *desh*. According to Harris, "The textual evidence for *desh* is not very significant, and there are no definite indications of the meaning of the word."<sup>9</sup> The famous Egyptologist Heinrich Brugsch at first thought *desh* meant "flint" and then changed his mind and thought it probably referred instead to limestone or alabaster.<sup>10</sup> That is certainly more appropriate for the "high walls" in Rosetau, although it would mean that they were white rather than black. At the very least, we may be confident that the translation of "flint" for the walls in Rosetau is incorrect, and that some form of stone is referred to.

And immediately adjoining these angled slabs, as may also be seen in figure 7.11, there is an adjoining vertical shaft of which we are told: “The Weary Ones, Kneeling Ones with mysterious faces, who live with the help of their throwing sticks. I am the stout of heart, he whose might is weighty, he who makes his way through the fire. . . . A way is made for me so that I may pass and save Osiris. I am he who sees the unique, who circles about, . . . he for whom a way is made, to whom it is granted to pass. In peace, in peace.”<sup>11</sup>

Because there are no figures of men, gods, or animals to be seen in this last section, the “Kneeling Ones with mysterious faces” appear not to be creatures at all, but stones of passages. I believe that these two sections of the picture and their texts refer to concealed entrances to passages such as the famous one inside the Great Pyramid at the junction between the Ascending and Descending Passages. In classical antiquity, the Descending Passage was known, but the roof of this passage contained a slab of limestone that concealed underneath a granite plug, the limestone being mounted on swivel bearings (see figure 7.15), which was flush to the roof but which, if moved or levered in the correct manner, could have been opened to reveal the Ascending Passage. This limestone slab fell off in the ninth century and has now been removed. I discuss this matter and quote a passage from the ancient Greek geographer Strabo about such stones later in this chapter. Even if this swivel stone was known, which is doubtful, the Ascending Passage could not be entered because it was blocked with the three granite plug stones (see figures 7.12 and 7.13). The swivel stone was an angled stone, like the ones in the coffin paintings, and I believe that the expression the “Kneeling Ones” is a general term that refers to such angled stones inside the pyramids. They are in the position of someone kneeling, and also, just like someone kneeling who rises to an erect position, they can be moved to become straight. They do indeed have “mysterious faces,” because they are concealed and appear to be normal passage-lining stones. As for “liv[ing] with the help of their throwing sticks,” this may be an esoteric allusion to their moving back and forth and returning to their place, just as the ancient Egyptian boomerangs did when used for hunting geese in flight. (Boomerangs are depicted in Old Kingdom tomb paintings, which show them being used in bird-hunting scenes.) “He whose might is weighty” could refer to the huge weight of these concealed and “kneeling” stone slabs that blocked the secret passage entrances. “Circles about” should probably be slightly retranslated to mean “turns about,” referring to the movement of the swivel stone on its hinge. And “sees the Unique” may refer to seeing the hidden signs in the passageways that indicate the locations of the blocked passages, just as the intuitive genius Sir William Flinders Petrie discovered the markings in the Descending Passage that indicated the existence of the swivel stone of the Great Pyramid. And I have seen such signs myself, which I believe indicate a similar concealed passage that could be reached from the passage that leads to the Queen’s Chamber. I discovered these one night when I had the interior of the Great Pyramid all to myself and was able to spend several hours minutely examining it inside without anyone disturbing me. During official opening hours, the crush of tourists is intolerable, and you cannot study anything properly at all.



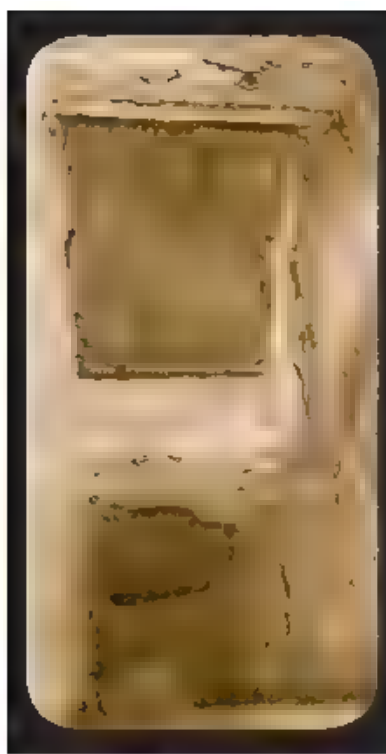


Figure 7 12 This photo shows very clearly the granite plug (top of photo) blocking the entrance to the Ascending Passage of the Great Pyramid from the Descending Passage. The plug is still there because entry to the Ascending Passage is from the forced passage made by al-Mamoun, which was tunneled through the limestone and went around it. This is plate LXVII on page 171 of John and Morton Edgar's *The Great Pyramid Passages and Chambers*, volume 1, Glasgow, 1910

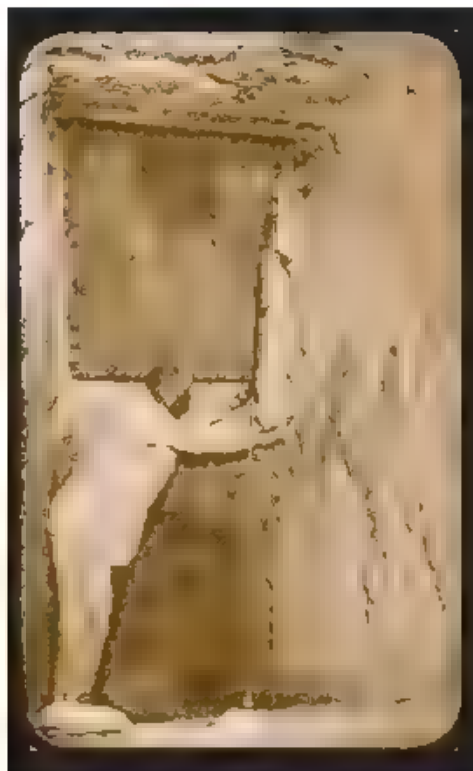


Figure 7 13 A photo of John Edgar, the pyramidologist, suspending a plumb bob at the point in the Descending Passage inside the Great Pyramid at Giza where the lowest of three successive granite plug stones may be seen in the roof, blocking access to the Ascending Passage. The limestone swivel stone that once concealed this granite plug stone from view had already been removed by this time (circa 1909). Edgar's own caption gives further details. This is plate LXVIII on page 172 of John Edgar and Morton Edgar, *The Great Pyramid Passages and Chambers*, volume 1, Glasgow, 1910 (the original edition with the best quality plates). John Edgar died as this book was in press in 1910. His measurements, studies, and above all his unrivaled interior photos (all of which would be impossible today) are extremely valuable. He spared no trouble and expense in obtaining the very finest photography possible at that time for interior views of every passage and chamber of the Great Pyramid.

In this esoteric manner that I have just suggested, genuine physical details of pyramid construction

seem to be hinted at. But they appear to be general and not confined to a single edifice such as the Great Pyramid alone, assuming that such blocked passages exist in most or all of the main pyramids. Since an empty concealed passage was discovered in the Pyramid of Meidum as recently as 1999, announced in 2000, and published in 2003,<sup>12</sup> and an analogous concealed passage above the passage leading to the Queen's Chamber in the Great Pyramid almost certainly exists, as many Egyptologists have now concluded, it seems likely that such passages are common, whether they are merely "relieving passages" connected with structural concerns or are genuinely intended to lead somewhere of interest or to contain something of importance.

Another statement in *The Book of Two Ways* that seems reasonably accurate in reference to these phenomena is the statement quoted above about how the roads of Rostau lead astray: "Each one among them meets the next and leads astray." This is an accurate description of what happens inside the Great Pyramid, since the Descending Passage meets the once concealed and blocked entrance to the Ascending Passage but continues to descend and thus "leads astray"

Yet another feature is of interest in the coffin painting from which the detail of figure 7.11 is taken. To the right of the stone slabs we see three horizontal passages directly over one another and separated from each other by stone courses. The text says: "Spell to pass over him [and] those who are below him."<sup>13</sup>

Now that the two horizontal passages with one directly over the other have been discovered inside the Pyramid of Meidum, and bearing in mind the suggested second passage lying directly over the passage leading to the Queen's Chamber inside the Great Pyramid, with of course the Grand Gallery in turn lying over that, we can appreciate that this picture may be an allusion to the structures inside at least two major pyramids. Indeed, it seems that three passages lying above one another do actually exist inside the Great Pyramid, as just described, and if one counts the Descending Passage, three are already known anyway.

Further on in the picture, two horizontal passages are shown lying one above the other. The text above them says: "The roads of Rosetau upon land." And beneath them the text says:

I have come to establish the things at Abydos, I have opened Rosetau, I have alleviated the suffering of Osiris. I am he . . . who makes his way in the valley. Oh Great One, make a path of light for me, that I may pass. . . . As to these Kneeling Ones, Geb [the primeval god of the Earth] has placed them in Rosetau near his son Osiris out of fear of his brother Seth, lest he might hurt him (?) If any man knows the names of these Kneeling Ones, he will be with Osiris forever, he will never perish.<sup>14</sup>



Figure 7 14. The strange Pyramid of Meidum, four hours' drive south of Cairo, which may or may not have partially collapsed in

antiquity (not everyone is in agreement as to what really happened to this structure, which is still surrounded by huge mounds of stone and rubble, as seen here). Did someone try to build a pyramid at too steep an angle, causing a disastrous failure in the structure? Inside it a concealed passage was discovered as recently as 1999. It could not be entered but was explored by means of fiber-optic probes. It is parallel to a known passage, and it is believed that a similar concealed parallel passage exists inside the Great Pyramid, running above the familiar passage that leads to the so-called Queen's Chamber. Such passages may be merely what engineers call "relieving passages" for construction purposes, or they may have a different purpose. Alas, too many of the interior features of the pyramids are baffling, and there may well be numerous undiscovered spaces inside them that we have not yet found or may even never find. (Photo by Robert Temple)

My suggestion that "the Kneeling Ones" are really angled swivel stones concealing entrances (such as the one known originally to have concealed the entrance to the Great Pyramid itself, seen in figure 7.15) draws support from a further portion of the text, which says: "If any man is seen there alive [in the innermost sanctum of Rostau], he will not perish eternally since he knows the Spell for passing the Kneeling Ones, the keepers of the gates."<sup>15</sup>

This makes it very clear that "the Kneeling Ones" are obstacles sealing the "gates" of the Rostau passages.

Not a great deal is known of the mechanical techniques by which the huge slabs were actually moved on their hinges in the ancient monuments, since although we can see the hinges and we know that such stones existed—and indeed the one at the entrance to the Great Pyramid is even described in the Greek text of Strabo (quoted in a moment) as still being in use and swinging open in Roman times—none survives intact. The one drawn by Flinders Petrie at the Bent Pyramid of Dashur no longer exists either (see figure 7.15, left side of picture). That pyramid at Dashur is extremely unsafe to approach and explore, due to the fact that it has so many of its original casing stones, and they sometimes fall off! For decades it was inaccessible because it was in a closed military zone, and obviously it was not studied during that time. The last time it was studied properly was by the brilliant Egyptian archaeologist Ahmed Fakhry in the days before Nasser came to power and created more military zones. I am very fortunate indeed to have a copy of his extremely rare work in three volumes, *The Monuments of Sneferu at Dashur*, the first volume of which deals entirely with the Bent Pyramid (volume I, Cairo, 1959). There is no mention or depiction of the swivel door in Fakhry's book, and I presume that Flinders Petrie's drawing was entirely a reconstruction.

There must be some swivel doors that are still in place and serving their purpose, but we have simply not discovered them because they are serving their purpose too well and remain successfully disguised! But whether one pushes on a certain spot in a certain manner or perhaps uses some lever or implement (perhaps referred to in the reference to "throwing sticks"?) to make a block of many tons' weight suddenly move on its hinges and open, we do not know. For most of her life at Abydos, Omm Sety, Selim Hassan's assistant, was always going around the Temple of Seti I and pushing here and there on suspicious-looking slabs, hoping to open them and gain entry to the many passages and chambers and crypts that she was certain were concealed both in and under the Temple of Seti I and in the Osireion and the tunnel she believed linked the two, but she never succeeded in finding the right way to shift any of these slabs. Who knows? Perhaps they don't work after all these millennia. Maybe they have become stiff and have "slab arthritis."



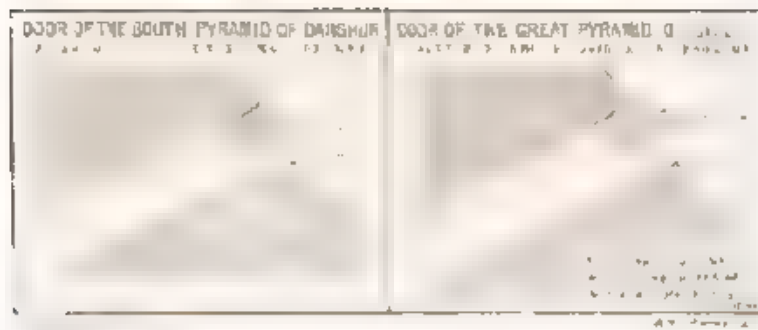


Figure 7.15 These two diagrams were published by Sir William Flinders Petrie as part of plate 11 of the first (and fuller) edition of his book *The Pyramids and Temples of Gizeh*, London, 1883. The diagram on the left shows the swiveling stone trick door that once led to the passage inside the Bent Pyramid at Dashur, but no longer exists in that pyramid, which retains many of its original casing stones. The diagram on the right shows Petrie's reconstruction of the similar trick swivel door that would originally have led into the Descending Passage of the Great Pyramid, and which was still in use in the first century AD, as recorded by the geographer Strabo. I believe that these secret swivel doors of stone that traditionally concealed the entrances to passages were the "Kneeling Ones" referred to in the Egyptian netherworld texts.

The one famous exception to this, of course, is the swivel slab that she seems to have opened by accident one day when she was stumbling around the temple and in a high fever because she was afflicted with Asian flu, feeling very dizzy and ill, and unexpectedly fell into a treasure room. She recounts this incident in her book.<sup>16</sup> During 1999, an intensive search for this chamber was carried on at the temple in Abydos by an American researcher. Although he did not find the chamber, in 1998 the remnants of a passage inside a wall near the Hall of Barques was found by the Egyptian archaeologist Ahmed El-Sawy, although it contained nothing of interest and does not appear to have been a passage of any major importance; this discovery was announced at the Eighth International Congress of Egyptologists, which I attended in Cairo in the spring of 2000, and was published in 2003.<sup>17</sup> El-Sawy's careful and conscientious work at Abydos was of the greatest possible interest to those who are interested in the Temple of Seti I at Abydos, a structure in which I have already written a detailed report of more than 60,000 words about our work there, which has not yet been published, and which will reveal many unexpected things when it appears. This does not appear in *Egyptian Dawn* because that book does not discuss the New Kingdom period.

If we can begin to decode the esoteric references in some of the ancient texts, we are in a better position to retrieve possibly important information about the monuments. By recognizing that the "Kneeling Ones" are probably swivel slabs blocking passageways, we are already getting somewhere.

The only contemporary description of a "Kneeling One" actually in use is found in the *Geography* of Strabo, a Greek writer who lived during the Roman Empire, first century BC–first century AD. Strabo visited Egypt, and in Book 17 of his lengthy work, he describes visiting the pyramids of Giza. He writes, "At the distance of 40 stadia from Memphis is a brow of a hill, on which are many pyramids, the tombs of the kings. Three of them are considerable. Two of these are reckoned among the seven wonders [of the world]. . . One pyramid is a little larger than the other. At a moderate height in one of the sides is a stone, which may be taken out, when that is removed, there is an oblique passage [leading] to the tomb."<sup>18</sup>

This proves that in Roman times the Descending Passage and the Subterranean Chamber (thought by the Romans to have been "the tomb," though no one today believes that) were known and regularly entered by tourists, and also clearly indicates that the Ascending Passage, Grand Gallery, and chambers higher up inside the Great Pyramid were entirely unknown at that time, since there is no mention of them at all. The swivel stone that could be "taken out" so that one could enter the Great Pyramid from the northern face is seen in reconstruction in figure 7.15. Figure 7.16 is a nineteenth-century photo of this

original entrance where the swivel stone once was; figure 7.17 shows its appearance in 1610. Strabo does not say how one got up the slippery side to this point, but there must have been a stairway or steps made for the visitors. At this time, of course, the casing stones still covered the pyramids, and Strabo even describes those covering the small Pyramid of Mycerinus (Menkaure) as being made of dark granite, but only “nearly as far as the middle,” the upper half of that pyramid apparently having been covered with the normal limestone.<sup>19</sup> It is interesting to know that the movable entrance stone of the Great Pyramid still functioned on a regular, presumably daily basis in the first century AD.

There are various scattered references in Greek literature to doors strangely swinging open in temples. In the *Ecclesiastical History* of Sozomen (fifth century AD), we find mention of a curious case of prison doors that “though fastened, opened of their own accord.”<sup>20</sup> The inventor Hero of Alexandria (who lived in the first and second centuries AD) in his book *Pneumatics* actually describes a mechanical device that can cause the doors of temples to swing open automatically and is triggered when somebody sacrifices upon an altar.<sup>21</sup> So mysteriously opening doors have been a feature of important sacred structures throughout antiquity.

There is one other possible esoteric reference that could be implied by the expression the “Kneeling Ones.” The sides of an acute angle look like kneeling legs. Perhaps the golden angle is being hinted at. To “know the Kneeling Ones” at Giza could also mean working out a knowledge of the Golden Giza Plan, as shown in figure 7.25. And the phrase in the text above about making “a passage of light” might refer to one of the aerial “rays” at a golden angle, which I discuss later, particularly the one that strikes the tip of the Pyramid of Chephren from the Sphinx at sunrise on the equinox.

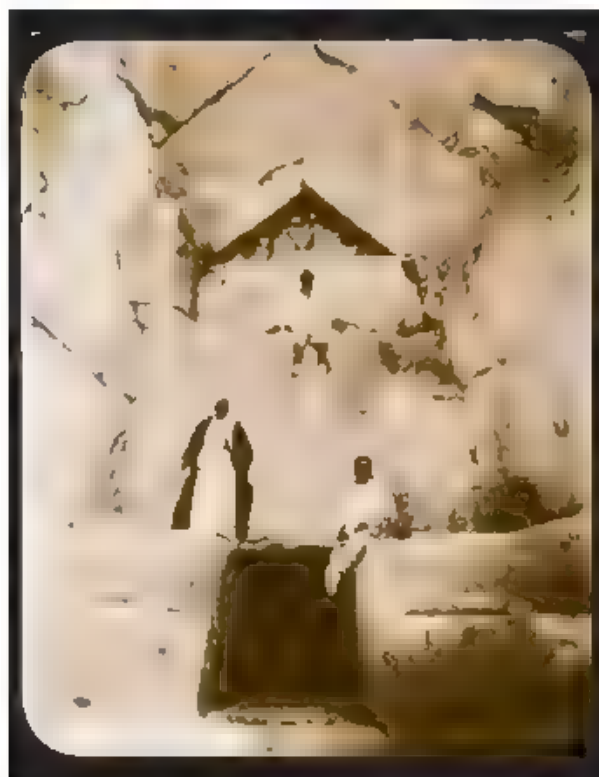


Figure 7.16. The original entrance to the Great Pyramid which is on the north face. The casing stones originally covered this, and in Roman times the entry was by a casing stone that was a secret, movable swivel stone which opened and let people in at this point. Roman tourists loved to enter the Descending Passage by this route and descend all the way to the Subterranean Chamber. The Ascending Passage was unknown to them, and hence also the Grand Gallery and the King's and Queen's Chambers. This old photo was reproduced only in a rare book entitled *Souvenir of Egypt*, published by George Doyas in Cairo (no date). It was given in 1898 to my grandmother by her friend Ebtanago Sehyoun, a Copt, of Kena in Egypt. She was friendly with him and some others of the Copts and had a particular interest in their culture and traditions. Directly above the head of the man sitting in the center of the photo is a strange shape carved in the stone, which Walter Marsham Adams in 1898 claimed was the hieroglyph for “horizon” showing two hills to either side with a dip in the middle, where the rising sun was meant to appear.





Figure 7 17 This engraving appeared in a book by George Sandys, *A Relation of a Journey Begun An. Dom. 1610*, London, 1615. It shows the original entrance to the Great Pyramid as it appeared at that time. (Collection of Robert Temple)

We must return now to *The Book of Two Ways*. Where things begin to get really interesting is in the descriptions of what is called “the Mystery of Rosetau.” There are various references to what appears to be the Great Hall or Chamber underground. Here are the suggestive passages:

Sealed is that thing which is in darkness. A flame is around it; it contains this efflux of Osiris, placed in Rosetau (?). He is hidden since he fell down into it. The descent to him goes over the country of sand. Indeed, what is under him is consecrated in Rosetau. . . . If any man is seen there alive, he will not perish eternally since he knows the Spell for passing the Kneeling Ones, the keepers of the gates. . . . Spell to be in Rosetau. I am the great Name, he who creates his light. I have come to thee, Osiris, I worship thee. He (the deceased) causes thy efflux to permit him to arise. . . . Spell to be in Rosetau, to live on the extra offerings beside Osiris. To proceed in peace, to protect Osiris; to pass by the gates. I am the great Name who creates his light. I have come to thee Osiris. I worship thee. Give me now away, I am purified by thy efflux. I have acted [so that I am the one] who has been exalted by the efflux which flowed out of thee. I have made the name of Rosetau since I fell into it. Salutation to thee, Osiris. Arise! Thou art powerful, thou art strong in life, health and prosperity, thou art powerful in Rosetau, thou art the strong one in Abydos. . . . O this charcoal wall!<sup>22</sup> I open my way in Rosetau that I may ease the suffering of Osiris. . . . [I am] he who is allowed to pass by . . . These are the words of what is inside the [region] of darkness. If any spirit knows this, he will live among the living. A fire is around it which contains this efflux of Osiris. If any man knows this, he will not perish there forever, for he knows that which is in Rosetau, [namely] the Mystery of Rosetau, since he fell there. He who comes down to [this] desert which contains this chest [illustrated in figure 57] is he who carries it in Busiris. [The reference is to the small settlement of Busiris at the foot of the Sphinx of Giza itself, called by the Egyptians Djedu, now known as Nazlet el-Samman, the Greek name of which is recorded by Pliny, who says: “Close by (Memphis) is a village called Busiris,

where there are people who are used to climbing these pyramids.”<sup>23</sup>] It is the decomposition of Osiris of Rosetau. . . Grant that I may be brought to thee, O Thoth. I open the Netherworld. . . The way of Thoth to the House of Truth. . . I am Thoth, the Lord of Offerings for Osiris, . . . this is for my father Osiris who is on the High Ground. . . I am the Great Soul of Osiris with whom the gods have ordained him to copulate, who lives on high by day, made by Osiris from the efflux of his flesh, [made] by the seed which came from his phallus, in order to come forth by day that he may copulate with it. . . For I am the Great Soul of Osiris with whom the gods ordained him to copulate. He lives through it (the soul) on high by day, [the soul] made by Osiris from his efflux which is in his flesh, [made] with his semen which comes out of his phallus, in order to come forth by day that he may copulate with it.<sup>24</sup>

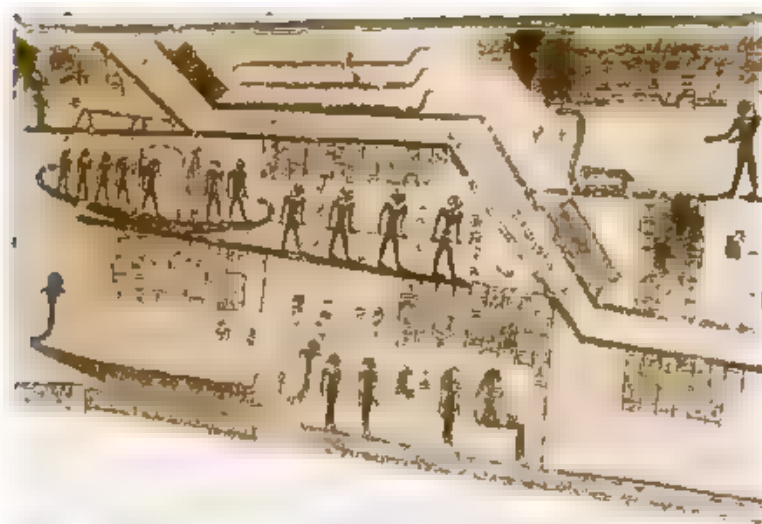


Figure 7 18 This is plate 80 from volume II: Plates, of Alexandre Piankoff and N. Rambova, *The Tomb of Ramesses VI*, Bollingen Series XL 1 (New York: Pantheon Books, 1954) photos by L. F. Husson. This image is from the left wall of Corridor G in the tomb and illustrates the fourth division of the ancient text called *The Book of What is in the Netherworld*. The sun god with a ram's head, is being towed in his solar barque. The text says "The towing of this Great God is stopped for a while in this mysterious Cavern of the West whose forms are holy. Taking care of those who are in it with his voice without being seen by them. The name of the Cavern is Life of Forms. The mysterious ways of Ro-setau [Rostau], the sacred roads of the Imhat Necropolis, the hidden gates which are in the earth of Sokaris, He on His Sand. They are like this, the guardians of the Holy Way to the entrance of the West of the netherworld. It is they who keep guard on Anubis. Ro-Setau. The mysterious roads of Ro-Setau, the divine portals. He [the sun] does not pass by them, it is only his voice that they hear. The road to enter the body of Sokaris, He on His Sand, a mysterious image invisible and imperceptible. Mysterious road which Anubis enters (leading) to him who hides the body of Osiris" (translation of Piankoff, vol. I, pp. 254–60) (Photo copyright © 1954 by the Bollingen Foundation)

To judge from these strange remarks, the ultimate secret of Giza sounds like a chamber full of the semen of Osiris! (The world's oldest sperm bank?) Or perhaps the semen is contained in a chest in that chamber. One wonders whether this might perhaps even be a reference to the coffer of the King's Chamber in the Great Pyramid. It is possible that the reference in the text quoted above to "the High Ground" is to the Giza Plateau, which is indeed high ground above Memphis. But it is not only the semen of Osiris that appears to be hidden at Giza; it is also the "efflux" or "decomposition" of Osiris that is meant to be concealed there. And there are other references in the ancient texts to this efflux of decomposition of Osiris and its concealment. What could this mean? We should keep in mind that there is an analogy to this concept in Christianity. "The body and blood of Christ" are continually spoken of in a sacramental and evocative context, and often the blood becomes "the water and the blood," or the mixture of two fluids. In the Anglican/Episcopal Church, one of the hymns frequently sung by the congregation contains a line about "the water and the blood which from thee forever flow." I used to ask what this meant when I was a boy, and I met with puzzled reactions. One suggestion was that because the priests

mix water with the wine for communion purposes, *those* were “the water and the blood,” as it is well known that the wine represents the blood of Christ, and devout people believe that through a magical and divine process that takes place during the mass, the wine is literally transformed into the blood of Christ, and that people who drink it really do drink Christ’s blood itself, not just a substitute. This is what is called “taking communion.” To suggest that priests add water to the wine because they don’t want to become drunk at mass is not a satisfactory explanation for the words of the hymn and the theological concept behind them. There is no doubt whatsoever that there was some vague concept of “the water and the blood” both streaming as an efflux from Christ on the cross, as a result of the spear wounding him in his side, the “water” presumably being the bodily fluid known as lymph. I mention these strange, obscure, and somewhat necrophilic Christian theological details only because they offer such a tantalizing analogy to the “efflux” of Osiris, who also died and rose again “in sure and certain hope of resurrection,” as the Christians say.

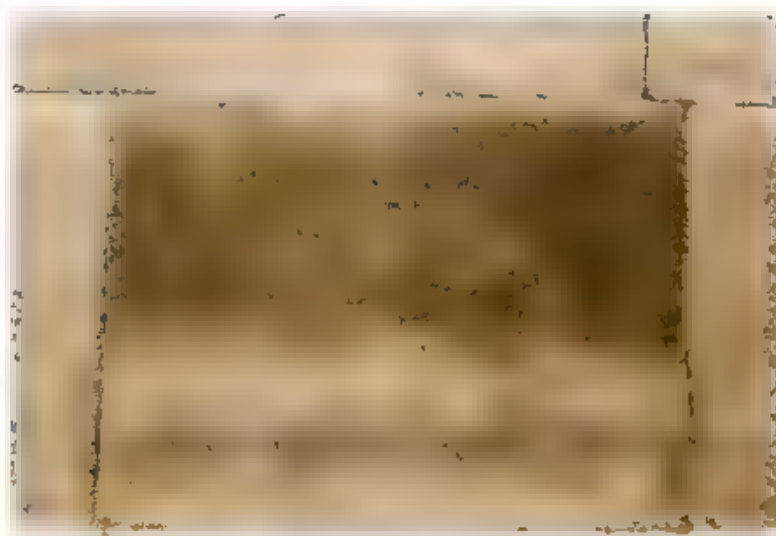


Figure 7 19. “O thou charcoal wall!” This quotation from the ancient Egyptian netherworld text *The Book of Two Ways*, which describes the obstacles and secrets concealed at Rosetau, may refer to the unexpected inclusion of a charcoal-colored basalt block in the midst of red granite blocks, such as this one at the Valley Temple of Giza, which is the traditional site of Rosetau. Not only does such a basalt block resemble a charcoal wall, but it was probably intended as a sign or signal to the initiated regarding the location of something. Since the text refers to a charcoal wall in connection with discussion of the “Kneeling Ones,” which I have already explained as swivel stones that block concealed passages (see figure 7 15), a stone such as this might have acted either as a swivel stone or as an indicator of a swivel stone, or of some other concealed secret, behind or beneath. To find things that the Old Kingdom Egyptians concealed, you have to think like an Old Kingdom Egyptian, it is useless to insist on thinking like a modern person. This is why only a few modern archaeologists, such as Sir William Flinders Petrie, have ever been able to find what the ancient Egyptians had hidden. The subterranean temple, the Osireion, at Abydos, was discovered only because Petrie noticed a slight dip in the sand and his intuition told him to dig there. An Egyptologist who does not have a highly developed intuitive sense, or does not listen to it, will never be a discoverer. (Photo by Robert Temple)

The Egyptian word that is generally translated as “efflux” is *redju*. Technically, it is the fluid of decomposition oozing from the corpse. (In the extreme heat of Egypt, this would have occurred rapidly.) It was similar to but distinct from what the Egyptians called *fedet*, which is the sweat of the corpse, since *redju* comes from the interior of the corpse, whereas *fedet* is produced on the exterior. However, *redju* had more profound associations. The word is thought to come from the Egyptian verb *redi*, “to give,” so that *redju* literally means “that which is given.” It was occasionally said to be responsible for the rise of the Nile and the inundation. It seems to have been conceived of as a kind of fluid emanating from the Earth at the source of the Nile, which created the life-giving Nile <sup>25</sup> The Nile may thus have been imagined as an internal secretion or seminal emission of the Earth. However, since efflux from the earlier god Sokar, god of the resurrectable Earth, was also viewed as the source of the Nile, that was probably the original



tradition prior to the Fifth Dynasty, before Osiris became amalgamated with Sokar as Sokar-Osiris<sup>26</sup> Plutarch specifically writes of the Egyptians: "They call not only the Nile but all moisture generally the efflux of Osiris." The Greek word used by Plutarch for "efflux" is *aporroē*, which means "a flowing off, stream, efflux, emanation."<sup>27</sup>

In one Coffin Text, we are told that *redju* was the substance out of which the *ba*-spirit or *ba*-power was formed: "For I am this great *ba* of Osiris . . . which Osiris had made from the fluid of his corpse, coming from his body."<sup>28</sup> (This reminds us of the Victorian medium's concept of "ectoplasm.") However, in a resurrected body, there is a fine line between the efflux of decay and the efflux of seed ejaculated from the reinvigorated phallus. Both are interior secretions. There are many sacred depictions of Isis fluttering as a *ba* over the corpse of her husband, Osiris, and settling down on his erect phallus to become impregnated with her son Horus. There was a special verb in Egyptian, *sab*, which meant "to flow out" or "to flow away," that was used to describe the "flowing away," "streaming," or "flowing out" of the *redju*. Clearly, we have here a concept not too remote from that of "emission," as of sperm. There are at least two Coffin Text spells that associate the "flowing away of the *redju*" with Anubis and claim that the emitted *redju* was actually called by the name of "jackal."<sup>29</sup> The name "leopard" (*sab*) was sometimes applied as a pun on the verb *sab*. This may have been connected with the high priest of Sokar wearing a leopard skin during the Festival of Sokar. What is clear in all of this is that there are many levels of meaning, and that everything related to the decomposition of the body after death was, in a society obsessed with mummification, also associated somehow with its opposite. The Egyptians were always saying that the decomposition products were "hidden," and especially hidden at Rostau. What, therefore, could we really expect to find in a chamber beneath Giza one day? An interesting survey of the concepts of *redju* was published in 2006 by Andreas Winkler in an article entitled "The Efflux That Issued from Osiris."<sup>30</sup> Winkler mentions that *redju* has a restorative function, signified in ritual as a libation, connected with the reassembling of the scattered limbs of Osiris and "that *redju* is positive for the deceased when the theme of reconstitution dominates . . ." (I have according to my practice in this book rendered *redju* wholly in English letters here, not in the linguistic symbols used by Winkler, which I have eschewed throughout this book because they are incomprehensible to the general reader.) Because I have elsewhere, in a still unpublished work, finally solved the mystery of what was really meant by "the limbs of Osiris," that interpretation opens a new perspective on the concept of what was ultimately meant by *redju*, but a full explanation must await some future occasion, as it is a lengthy discussion that relies on some complex physical evidence concerning an Egyptian site that affords the "key" to the mystery and its associated secret ritual.

If we ever find and open such a chamber, we should be prepared possibly to find not a grand Hall of Records as many well-wishers imagine, but perhaps a repository of some strange ceremonial fluid, even possibly one containing dangerous substances. The "efflux of Osiris" might be something unpleasant and harmful. There is other evidence suggestive of this, but a discussion of this subject leads us too far astray from our main subject. On the other hand, the "efflux of Osiris" might be "hidden" in its corresponding opposite form, gold. As Zandee says, in quoting one of the Pyramid Texts: "The body of the dead is of gold like that of a god and so it consists of imperishable material. 'Rise on your bones of bronze and on your limbs of gold, for this body of yours belongs to a god. It does not perish. It does not decompose, it does not consume.'"<sup>31</sup> By not consuming, they mean not eating. If you don't eat, you cannot decay. So perhaps there is a secret chamber beneath Giza that contains the "efflux of Osiris" changed into a gigantic mass of gold. Perhaps this is the true origin of alchemy, where the "essence of gold" can bring eternal life. Alchemy, especially the alchemy of the ancient world (both Western and Chinese), is a subject that I have

studied in a certain amount of depth. I referred to this in passing in my book *The Genius of China* (for instance, in pointing out that gunpowder was discovered by Chinese alchemists), and I have written a large portion of a still unfinished novel on the subject of alchemy, which elucidates many unusual aspects of the subject. Clearly, I cannot discuss such things here, as it would be too great a distraction from our main concerns. However, I am not alone in being convinced that many alchemical processes and traditions originated in Egypt. As recently as 2004, an article appeared in the periodical *Discussions in Egyptology* by Daniel Burnham entitled “Explorations into the Alchemical Idiom of the Pyramid Texts,”<sup>32</sup> referring to the earlier work by Jack Lindsay (*The Origins of Alchemy in Greco-Roman Egypt*, 1970), and attempting to explain these matters more fully. Unfortunately, we cannot pursue this discussion, and once again I am forced to touch on the fascinating subject of alchemy only in passing. One must always keep in mind, however, that the “death” of Osiris and his “resurrection,” the “essence of gold,” golden statues, and all such symbolical matters may conceal allusions to alchemical concepts and practices. It is highly likely that the Philosopher’s Stone is originally an Egyptian concept, and that “turning things into stone” for funeral monuments may be associated with this idea. But we must move on.

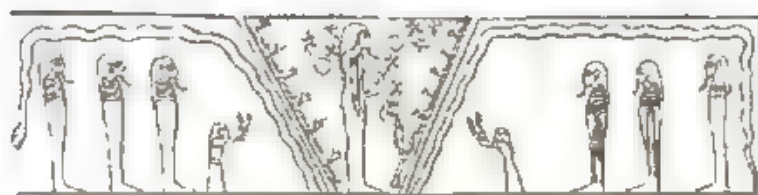


Figure 7 20. In the Tomb of Rameses VI, the central figure has no name. In the Tomb of Rameses IX, another representation of him gives him the name “the One who hides the hours.” In fact, this central figure represents the creator god (in this case, Osiris, though originally the creator god was called either Atum or Ptah, depending on whether you were at Heliopolis or Memphis) creating the universe with his sperm by an act of masturbation. In this representation from the tomb of the earlier pharaoh, the scene is not as clear as it is in the Tomb of Ramesses IX, which was beautifully engraved in *Description de l’Égypte*, Paris, 1809, an engraving I have in my collection and have published with my article “The Prehistory of Panspermia: Astrophysical or Metaphysical?” in *International Journal of Astrobiology*, 6 (2), pp. 169–180 (2007). (This article discusses ancient theories resembling those of “panspermia,” the process by which life spreads throughout the universe by means of tiny seeds, ideas that were held by several ancient cultures such as the Egyptians, the earliest Hindus of India, and the Greek philosopher Anaxagoras.) The picture shows the youthful god Horus being created by a dribble of sperm from the erect phallus of Osiris (here Horus is seen as a dangling infant just below the tip of the phallus). The trails of sperm are seen throughout the sky, passing between various stars of the cosmos and a number of recumbent receiving parties, who are taking divine disks of light into their hands from the trails of sperm. The creator god stands triumphant atop the defeated body of the serpent Apophis, evil retarder of progress, of life, and of resurrection. The reference to the creator god as “the One who hides the hours” refers to the fact that he created the hours, and time itself, when he created the universe, but the secrets of time and the hours are so esoteric that he hides them from the profane, so that they are known only to the highest level of priests. This image represents an amalgamation of an extremely ancient concept of the creation of the entire cosmos with the conception of the rising of the giant Osiris at the horizon, and indeed, it is likely that these were ideas that were always thought of as one during the New Kingdom period. This is figure 95 on page 339 of volume I, Alexandre Piankoff and N. Rambova, *The Tomb of Ramesses VI*, Bollingen Series 40.1 (New York: Pantheon Books, 1954), 2 vols.

We are assured that if we can gain access to this hidden shrine, we will “live forever” (Careful! “Living forever,” to an ancient Egyptian, tended to mean eternal life after death!) And this brings us back to *The Book of the Hidden Chamber*, which has more specific things to say about the mystery of Rostau. This book survives in two versions, the “long” and the “short.” But the short version is not simply an abbreviation of the long version; it actually gives a slightly different emphasis to certain things and uses some different textual passages that do not occur in the long version. The only publication of the short version in English was by Budge. In this translation the name Rostau is given in two variations: Re-Statet and Re-Sethau. Here are some of the intriguing remarks that we find there (Budge capitalizes some names):



Whosoever knoweth this representation of the hidden roads of RE-STATET [Rostau], and the holy paths of the AMMEHET, and the secret doors which are in the Land of SEKER [Sokar], the god who is upon his sand, shall be in the condition of him that eateth the bread-cakes which are [made] for the mouth of the LIVING gods in the Temple of Tem [Atum].

Whosoever knoweth this shall be in the condition of him that is *maāt* [Cosmic Order, absolute truth] on the ways, and he shall journey over the roads of Re-SETHAU, and he shall see the representations of the AMMEHET [a name for the underworld]. . . . This great god [the sun god at night] is towed along over the ways of Maāt of the Tuat [underworld] through the upper half of this secret Circle of the god SEKER [Sokar], who is upon his sand, and he neither looketh upon nor gazeth at the secret figure of the earth which containeth the flesh of this god. . . . AMENT [the West] is the name of the Circle of this god, [and in it are] the secret path of Amentet [a name for the most secret and hidden part of the underworld], and the doors of the hidden palace, and the holy place of the LAND OF SEKER [with his] flesh, and [his] members, [and his] body, in the divine form which they had at first.

BAIU-AMU-TUAT [the spirits who are in the underworld] is the name of the gods who are in [this] Circle. Their forms (*aru*) who are in their hour, and their secret shapes (*kheperu*) neither know, nor look upon, nor see this image (or, similitude) of SEKER (or, the hawk) himself.

Whosoever shall make these representations according to the image which is in writing in the hidden places of the Tuat, at the south of the Hidden Palace, and whosoever shall know them shall be at peace, and his soul shall unite itself to the offerings of SEKER, and the goddess KHEMIT shall not hack his body in pieces, and he shall go on his way towards her in peace <sup>33</sup>

One detail not to be overlooked in this “short form” of the *Book of the Hidden Chamber* is that the great chamber of mysteries concealed in the Land of Sokar at Giza is here apparently described as being “south of the Hidden Palace.” This crucial geographical information does not occur in the “long form” of the same book. This is yet further evidence that these sections were incorporated from some more ancient common text, for otherwise how would the short version contain things that are not in the long version? The short version was obviously a different abridgment of the original source, not an abbreviation of the long version.

What does this mean, “south of the Hidden Palace”? The Hidden Palace might be an appropriate way of referring to the Great Pyramid, as it is the grandest structure to be seen at Giza. In the seventh hour of the same book, there is a reference to “the similitudes which are in writing at the northern side of the Hidden Palace in the Tuat,”<sup>34</sup> so these references may be to the northern and southern faces of the Great Pyramid. And what does it really mean when this ancient text says that an initiate should make copies of the pictures relating to Giza, such as the ones hidden north of the Hidden Palace?<sup>35</sup>

Another point we should notice is that in this text it is not the flesh of Osiris that is said to be beneath Giza. Here it clearly says that the buried flesh is the flesh of *Sokar*. At Giza, Sokar was the original god, and Osiris was a form of him that came later. Margaret Murray stresses this when she tells us: “Osiris Sokar . . . the anthropomorphic god of the dead, as identified both with Ptah and with the hawk-headed Sokar; the three together forming the triple god, Ptah-Sokar-Osiris. The dominion of Sokar is given in the 4<sup>th</sup> and 5<sup>th</sup> divisions of the ‘Book of Am Duat,’ but M. Jequier shows that the dominion of Sokar was originally quite distinct from that of Osiris, and that the two have been incorporated together in the ‘Book of Am Duat’ by later theologians.”<sup>36</sup>



Figure 7 21. The name of the god Osiris, surviving in superb condition on a wall of the temple of Seti I at Abydos. The seated figure of a god on the right is what is called in hieroglyphics a "determinative" sign, which indicates that the name is that of a god. The actual name in Egyptian is generally transliterated as Asar (which is the origin of the Greek form, Osiris). It is symbolized by the two hieroglyphs of an eye and the strange shape on the left, which is thought by Egyptologists to represent a throne. In fact, I do not believe the sign on the left actually represents a throne at all, but something else entirely. I believe it is a specific section of a sacred rectangle, and that it is related both to the archaic sacred rectangular enclosures of the early pharaohs and to certain arcane geometrical conceptions. A vertical line drawn through the pupil of the eye makes a golden angle with a line drawn from the pupil to the tip of the bottom "step" of the rectangle segment. (Photo by Robert Temple)

However, the substitution of Osiris for Sokar, which we found so completely done in the Middle Kingdom text, *The Book of the Two Ways*, that we considered a moment ago, was incompletely done in the New Kingdom text of the short form of *The Book of the Hidden Chamber*. Using the fundamental logic of textual analysis, we do not need to be geniuses to conclude that the short form of *The Book of the Hidden Chamber* preserves an earlier and unamended form of the tradition, and is thus an earlier text than *The Book of the Two Ways*. But since *The Book of the Two Ways* dates from the Middle Kingdom and *The Book of the Hidden Chamber* dates from the much later New Kingdom, there is only one conclusion that can be drawn here: the "later" text is later only in that it survives from later editions, but it is really earlier. In other words, we have conclusive textual proof that at least the section dealing with Rostau/Giza of *The Book of the Hidden Chamber* is earlier than the Eleventh Dynasty of the Middle Kingdom (1987–1938 BC) from which *The Book of the Two Ways* is known to survive. Since the material must predate 2000 BC and the Middle Kingdom, and since it cannot possibly have come from the First Intermediate Period (2180–1987 BC) before that, due to the total collapse of Egyptian civilization at that time of social chaos, it must therefore predate 2200 BC and be of Old Kingdom date. This places it no later than the Sixth Dynasty and the Pyramid Texts and means that it is equal in age to those oldest-known Egyptian religious texts. However, I have taken a rather conservative approach to tracking the date of the text. One distinguished German Egyptologist, H. Altenmüller, hasn't bothered with such niceties, and says without a blush that he thinks the text comes from the Fourth or Fifth Dynasties (2640–2360 BC).<sup>37</sup>



Figure 7 22. Here the priests of Sokar, the original lord of the underworld (whose position was later taken by Osiris), are seen carrying the Sokar barque in procession at Giza during the annual Sokar Festival, when they made a circuit with it of the sacred areas near the Sphinx. The strange object with a bird's head sitting in the middle of the barque is a fetish that represents Sokar, in the form of a mummified hawk, with his head protruding from the mummy wrappings. The third priest from the left is wearing an animal skin (which we know from other depictions to be a leopard skin, though the spots are not visible in this picture) over his shoulder, and the medallion suspended on his chest shows that he is the chief priest of the group, while the priest behind him appears to be his deputy and carries a sacred wand or scepter. The two main priests in the center are not sharing in the actual bearing of the load, which is borne by the four groups of four junior priests, suggesting that as sixteen men were needed to carry it, the boat must be heavier than it appears. The exact nature of the Sokar fetish is not known, and the huge mummified portion may have contained something secret and concealed beneath the wrappings. My theory about this fetish is that a solid gold statue of Sokar was concealed inside, making the barque extremely heavy. This gold statue would have been the central cult statue of the god, normally kept in the inner sanctum of the temple. When carried outside once a year, it had to be concealed from the eyes of the profane, and it also could not be exposed to the light of the sun, because Sokar was known never to emerge from his perpetual darkness. The small Sokar-head on top of the fetish serves merely to identify the fetish so that people can realize that the true Sokar is concealed inside the mummy wrappings, in keeping with his nature. This engraving of a temple carving was published in 1809 in *Description de l'Égypte*, before the decipherment of hieroglyphics, but care was taken to engrave correctly the two hieroglyphs in front of the chief priest, which read sem. This specifically identifies the chief priest in the picture as a Sem priest, and that means that we have here a picture of the high priest of Ptah from the Temple of Ptah at nearby Memphis, in his role as head mortuary priest, or Sem priest, of Sokar. Ptah and Sokar were merged as a joint divinity at Giza. Later the divinity was called Ptah-Sokar-Osiris and became a sacred trinity. The location of this temple carving is unknown, and it has possibly perished since this drawing of it was made prior to 1809. It is possible that it was carved on one of the walls of the Temple of Ptah but was among the vast amount of stone carried away from Memphis and Giza for use in the construction of mosques and palaces in Cairo during the nineteenth century. (Collection of Robert Temple)

Thus, whatever this section dealing with the fourth and fifth hours of the underworld contains, it is truly ancient and has a claim on our attention as possibly containing accurate details relating to some of the mysteries of Giza.

Let us therefore look even more closely at the intriguing short form of *The Book of the Hidden Chamber*. The text specifically refers to "the secret figure of the earth" being on the surface at Giza, above the hidden chamber of Sokar. This reminds us of the many interpretations of the measurements of the Great Pyramid as representing the precise size of our globe. This text could reasonably be claimed as near-contemporary evidence, dating at least from the Old Kingdom, of a description of a major structure on the surface at Giza that was considered to represent the secret figure of the Earth, and therefore to substantiate with textual evidence all the physical evidence that has been so fully brought forward by those who insist that the Great Pyramid is indeed a secret figure of the Earth.

The first to propose this extraordinary hypothesis was the French scholar Edmé-François Jomard, who accompanied Napoleon to Egypt in 1798. Jomard was concerned with the height of the Great



Pyramid, and he calculated the height of the apothegm (the central line going up the middle of any of the sides) as being 184.722 meters. This was the “slant height” of the pyramid, which by means of trigonometry could help calculate the vertical height. Here is how Peter Tompkins, in *Secrets of the Great Pyramid*, describes what happened next:

Jomard remembered that according to Diodorus Siculus and Strabo, the apothegm of the Pyramid was supposed to be one stadium long. He also knew that an Olympic stadium of 600 Greek feet—from which our modern sports stadium is derived—was a basic unit of land measure in the ancient world, one which was said to be related to the size of the earth. . . . Searching further through the trunks full of classics which the savants had brought to Egypt, Jomard found that the stadium of the Alexandrine Greeks [in Egypt] . . . had been the equivalent of 185.5 meters—which was within a meter of what he had found for the apothegm.

To reinforce the point, Jomard discovered that the distance between the Egyptian localities as measured by Napoleon’s surveyors also coincided with the classical distances between these localities computed in stadia, if the stadium was taken to be 185 meters.

Finally, Jomard learnt from his perusal of the classics that a stadium of 600 feet was considered to be 1/600 of a geographical degree.

Jomard calculated that a geographical degree at the mean latitude of Egypt was 110,827.68 meters. Dividing this figure by 600 resulted in a measure of 184.712 meters. This was within 10 centimeters of his value for the apothegm.

Could the Egyptians, Jomard wondered, have been capable of working out their basic units of measure—such as the stadium, the cubit, and the foot—from the size of the earth and then built this into the Pyramid?

To reinforce this exciting hypothesis Jomard found that several Greek authors reported that the perimeter of the base of the Pyramid was intended to measure half a minute of longitude. In other words, 480 times the base of the Pyramid was equal to a geographical degree.

Jomard took the 110,827-meter degree and divided it by 480. The result was 230.8 meters, or again within 10 centimeters of his measured length of the base [of the Great Pyramid]. . . . To the end, Jomard remained convinced that the builders of the Pyramid had the necessary astronomical know-how to measure a geographical degree and thus the true circumference of the earth, and had developed an advanced science of geography and geodesy which they had immortalized in the geometry of the Great Pyramid. . . . Jomard’s classically indoctrinated colleagues could not stomach the idea that their cherished Greeks might not be the founders of geometry; so the pursuit was dropped.<sup>38</sup>

There are obviously more details to this than I have given, but we do not need the full mathematical account to get the idea. Jomard’s hypothesis was not at all outrageous, really, for it had a good pedigree in statements made by various ancient authors. It did not just come out of his head, but was forced upon him by his work. And Jomard was not tainted at all with “Bible mania,” as so many of the English authors who wrote about the Great Pyramid were. For some reason, the French were much more sane and did not drag their religious fantasies into their Egyptian studies in the way that the English and the Scots, and many religious Americans, repeatedly did.

The next scholar to consider seriously the theory that the Great Pyramid represented the northern hemisphere of the Earth in symbolic form was John Taylor, in his fascinating book *The Great Pyramid:*

*Why Was It Built? And Who Built It?* published in 1859. It took me a very long time to obtain a copy of this book, as it is so rare. Taylor's book is really very thought provoking. One of his curious discoveries, it turns out, can be interpreted only on the basis of something I published in my own book *The Crystal Sun* 141 years later, in 2000.<sup>39</sup> By that time, alas, it was too late to inform Taylor! But he discovered the very strange fact that two prominent ancient Egyptian units of measurement differed from each other by the tiny amount of 1.01. He was justly puzzled by this. In *The Crystal Sun* I explain that the precise number that we write in our modern decimal notation as 1.0136 (but that the Egyptians expressed as a fraction) was "the greatest secret of the ancient Egyptians," well known to them from its connections with both musical theory and the calendar, and so it is not at all surprising that the same number was embodied in their system of sacred measurements (although as I did not yet have Taylor's book, I was unable to mention it in *The Crystal Sun*). I have returned to this subject of measurements in my book *Egyptian Dawn*. But in the meantime, to retain the thread of our thoughts, I want to show how Taylor conceived of the Great Pyramid as what the ancient text calls "a secret figure of the earth"

The angle of the casing-stones being  $51^{\circ} 50'$  . . . What reason, it may be asked, can be assigned for the founders of the Great Pyramid giving it this precise angle, and not rather making each face an equilateral triangle? The only one we can suggest is, that they knew the Earth was a sphere, that they had measured off a portion of one of its great circles; and by observing the motion of the heavenly bodies over the earth's surface, had ascertained its circumference, and were now desirous of leaving behind them a record of that circumference as correct and imperishable as it was possible for them to construct. They assumed the Earth to be a perfect sphere, and as they knew that the radius of a circle must bear a certain proportion to its circumference, they then built a Pyramid of such a height in proportion to its base, that its perpendicular would be equal to the radius of a circle equal in circumference to the perimeter of the base. To effect this they would make each face of the Pyramid present a certain ascertained angle with reference to its base (supposing a vertical section made of it), which angle would be that of  $51^{\circ} 51' 14''$ , if modern science were employed in determining it. . . . Now the actual angle of the casing-stones was found to be  $51^{\circ} 50'$ . Can any proof be more conclusive than this, that the reason we have assigned for the construction of the Great Pyramid was the true reason which influenced its founders? How the thought occurred to them we cannot tell; but a more proper monument for this purpose could not have been devised than a vast Pyramid with a square base, the vertical height of which Pyramid should be the radius of a sphere in its circumference equal to the perimeter of that base. It was impossible to build a hemisphere of so large a size. In the form of a Pyramid, all those truths might be declared which they had taken so much pains to learn; and in that form the structure would be less liable to injury from time, neglect, or wantonness, than in any other <sup>40</sup>

If Taylor had known that the short form of *The Book of the Hidden Chamber* dating from the Pyramid Age had mentioned a structure at Giza that was called "the secret figure of the earth," he would have jumped for joy, for this was precisely what he had decided the Great Pyramid really was. Those who are determined to believe that the Great Pyramid was built as a pharaoh's tomb can still retain their belief and at the same time admit that the Great Pyramid was also a "secret figure of the earth," since the two intentions are not in any way incompatible with one another. After all, a pharaoh can be buried in a pyramid that either is or is not a "secret figure of the earth," as the symbolic message of the structure would not interfere with his eternal rest. I personally do not accept the theory that the Great Pyramid was ever built to be a tomb and have already called attention to the fact that Herodotus specifically stated that it was not one. It may have been intended as a dummy tomb or a symbolic tomb, but I am certain that it



was never a real tomb. I do not believe the empty sarcophagus in the King's Chamber ever held a corpse. One of the curious things about that sarcophagus is that it is too large to fit through the door, so it can never have been carried in. In *The Crystal Sun* I discuss numerous strange aspects of the King's Chamber, which I will not repeat here.

In *Secrets of the Great Pyramid*, Peter Tompkins also gives prominent attention to John Taylor's pioneering work, although he was unaware that the book was published in 1859 and knew only a subsequent edition of 1864. Tompkins's account, as usual, is very amusing.

Taylor then discovered that if he divided the perimeter of the Pyramid by twice its height, it gave him a quotient of 3 144, remarkably close to the value of  $\pi$ , which is computed as 3.14159+. In other words, the height of the Pyramid appeared to be in relation to the perimeter of its base as the radius of a circle is to its circumference.

This seemed to Taylor far too extraordinary to attribute to chance, and he deduced that the Pyramid might have been specifically intended by its builders to incorporate the incommensurable value of  $\pi$ . If so, this was a demonstration of the advanced knowledge of the builders. . . . Searching for a reason for such a  $\pi$  proportion in the Pyramid, Taylor concluded that the perimeter might have been intended to represent the circumference of the earth at the equator while the height represented the distance from the earth's center to the pole.

Perhaps Jomard had been right: perhaps the ancient designers *had* measured the length of a geographical degree, multiplied it by 360° for the circumference of the globe, and by the  $\pi$  relation had deduced the polar radius of the earth, immortalizing their knowledge by making the circumference to scale with the perimeter and the radius to scale with the height of the Pyramid. Taylor underlined his thesis: "It was to make a record of the measure of the Earth that it was built."<sup>41</sup>

In other words, it was what *The Book of the Hidden Chamber* calls a *secret figure of the earth*.

Having now dealt with this subject by way of an introduction to some of the more ambitious measurements and designs that may possibly be incorporated into the various structures of the Giza Plateau, it is time to explore the interrelationships of those structures in space, and specifically those that affect the Sphinx. My next book, *Egyptian Dawn*, contains extensive discussion of the pyramids themselves, but Sphinx matters are dealt with in this book. In *The Crystal Sun*, I already put forward the evidence that the Pyramid of Chephren was built where it was, and to the size it was, for a very important reason, and as part of a larger plan linked to that of the Great Pyramid. The photo in figure 3.10 of this book shows the shadow cast by that pyramid onto the south face of the Great Pyramid at sunset near the time of the winter solstice, similar to one I published in *The Crystal Sun*, and I have already discussed in *The Crystal Sun* its significance in terms of the placing of the Pyramid of Chrephren on the plateau. What about the Sphinx? Are there any determining factors in terms of the other monuments on the Giza Plateau that might be held to specify both its position and its size? As it happens, there are

In chapter 3, I described my discovery, by means of a scientific instrument called an inclinometer, when I took a sighting through the instrument of the tip of the Pyramid of Chephren while I was standing on the floor of the Sphinx Temple. By reading the information given by the inclinometer, I discovered that the line of sight made the unique sacred angle of the Egyptians of 26° 33' 54" (which we call the golden angle, as it is the only angle produced in the only triangle, the "golden triangle," that can be constructed by means of the Golden Section) with the base of the temple. I could not be as precise as measuring the 54 seconds, but it was clear that the golden angle was intended. This did not surprise me, because I had

already discussed the golden angle at such length in my earlier book *The Crystal Sun*, where, as I have already mentioned, I published a photograph (and another is now published here as I just said) showing that angle being cast as a shadow onto the south face of the Great Pyramid at sunset on the winter solstice (a shadow cast by the nearby Pyramid of Chephren). This was the largest and most dramatic physical indicator of the importance of a solstice in the whole of the ancient world. It is shown in figure 3.9, and I have reproduced again the color photo from that book on this book's website. My discovery was of particular importance because it is the same angle of inclination of both the Ascending and Descending Passages inside the Great Pyramid, thus hinting on the outside at what lay on the inside. This is the kind of mysterious behavior that so delighted the ancient Egyptian priests. I also reported in that book my discovery that the ascending passage that leads out of the Valley Temple onto the Chephren Causeway was inclined at the same golden angle (see figure 7.23). That passage is what I call a golden slope, which is the name I give to a slope that rises or descends at a golden angle to the horizontal plane. (Both the Ascending Passage and the Descending Passage of the Great Pyramid are therefore what I call golden slopes.)

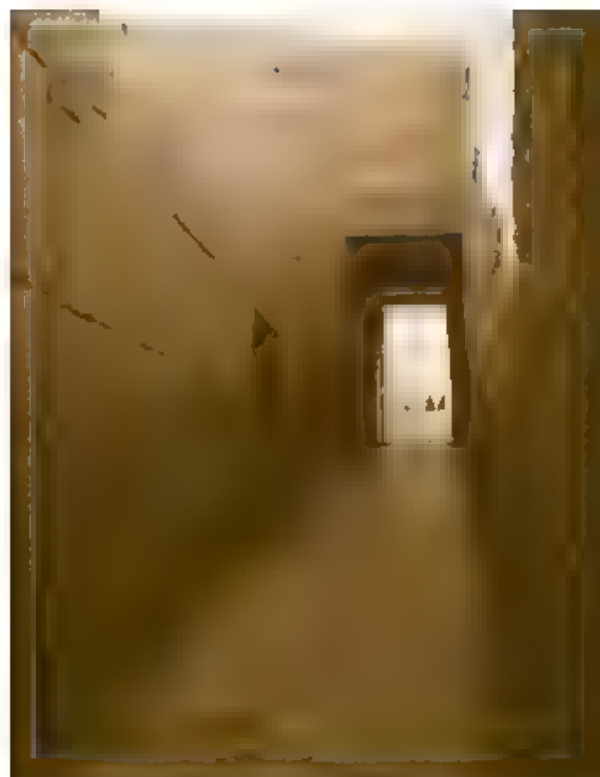


Figure 7.23. This is the ascending passage that leads out of the back (west end) of the Valley Temple at Giza, onto the Chephren Causeway, in the direction of the Pyramid of Chephren. Its floor is of Egyptian alabaster and its walls are of red granite. I measured the angle of its slope and found that it was the golden angle, identical to the slopes of both the Ascending and Descending Passages inside the Great Pyramid. I was the first person to notice this golden angle in the Valley Temple. Because golden triangles (a golden triangle as I use the term being a right triangle with a golden angle as its acute angle opposite the altitude) were so important at Giza, I am certain that there is a subterranean crypt beneath this passage, which has probably been sealed since Old Kingdom times. That is because when they have a golden slope, the Egyptians always have a golden triangle as well, with that slope constituting the triangle's hypotenuse. And when an enclosed space falls below that slope, there tends to be a chamber, because it is a sacred spot. The so-called Grand Gallery inside the Great Pyramid is the hypotenuse of a golden triangle which defines the location of the so-called Queen's Chamber, with the passage leading to it as one of the sides of the triangle and the chamber itself being situated at the base of the right angle (see figure 54 in my book *The Crystal Sun*). I believe that the probability of there *not* being an important chamber beneath the doorway at the top of this ascending passage is zero.

(Photo by Robert Temple)

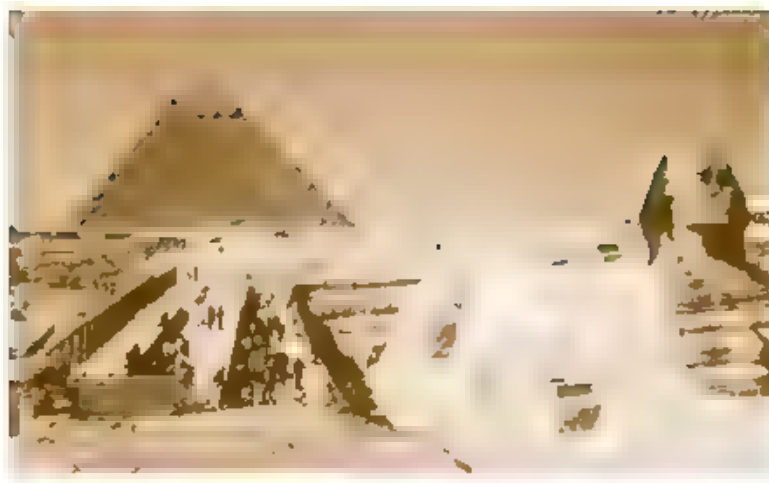


Figure 7.24 This photo is taken from the top of the Valley Temple looking up toward the Pyramid of Chephren along the limestone Chephren Causeway. As can be seen, the causeway is at an odd angle (not the golden angle) to the pyramid and also to the temple, and no one has ever explained why. The ascending passage arising out of the Valley Temple and leading to the back doorway that opens onto this causeway (see figure 7.23) is on a slope that is the golden angle, identical to the slope of the Ascending and Descending Passages inside the Great Pyramid. The line of sight that passes through the air from the top of the Pyramid of Chephren to the floor of the Sphinx Temple is also at the golden angle (as I measured with an engineer's device called an inclinometer), as shown in figure 3.13. The shadow cast by the Pyramid of Chephren at sunset of the winter solstice upon the south face of the Great Pyramid also forms a golden triangle, with its hypotenuse forming the golden angle (see figure 3.10, and also plate 30 in my book *The Crystal Sun*). The exact position and size of the Sphinx are also determined in relation to the two main pyramids by multiple golden angles, as shown in figure 7.25. All three of these key monuments had to be placed exactly where they are and had to be exactly the sizes they are as part of a unified conception based on geometric principles. (Photo by Robert Temple)

In *Egyptian Dawn* I give a large number of new discoveries concerning the unified design concept of the Great Pyramid's interior structure. Many of these discoveries have nothing whatsoever to do with the Golden Section, and are straightforward design criteria of a remarkable kind that no one had ever noticed before. There is a second category of design criteria, however, that is wholly connected with the Golden Section. The categories appear to be separate, as if one was superimposed upon the other, thus offering two separate "stand-alone" levels of discoverability to the investigator, one that gives the impression of having been designed to be "idiot-proof" for the most basic investigator to find and one at a higher level of difficulty. I felt as if I was decoding two separate levels of design information, and doubtless there is more to find! Someone really clever now needs to come along and figure out the rest of it, such as what it all means and what it was for!

One reason for bringing the Great Pyramid into the discussion in this chapter is to lay the basis for revealing a hitherto-unnoticed connection between the precise location of the Sphinx and that wonderful structure the Great Pyramid, for the Sphinx's size, general shape, and location are all determined directly by its relationship to the Great Pyramid, as we will now see, and as is made clear in figure 7.25. No one has ever noticed this before, because it is not at all obvious.

In figure 7.25 I reproduce part of the official Egyptian government geodetic survey map of the Giza Plateau, of the sort that in Britain is called "an ordnance survey map," which may be presumed to be as accurate as any other map of the Giza Plateau in existence. It is certainly more reliable than any of the plans prepared by archaeologists, which I have found are often misleading and lacking in accuracy.

I have overlaid across the map in figure 7.25 various lines connecting key points of monuments on the Giza Plateau, and where the golden angle recurs frequently. It is in fact a dominant motif of the entire Giza Plateau Plan.

We can see that the size of the Sphinx is determined first of all by three rays emanating at an identical angle, the "golden angle," from three separate key points of the Great Pyramid and striking it at its own



defining points, namely front, midpoint, and rear. The first of these emanates from the northeast corner of the Great Pyramid. This makes a golden angle with the north–south meridian that defines the east face of the Great Pyramid, and it shoots off toward the Sphinx and strikes the northeast tip of that monument, which is the left tip of its left paw. In other words, this ray connects the northeast corners of both monuments with a line drawn at the golden angle to a north–south meridian at either point.

The second defining ray emanates from the midpoint of the base of the Great Pyramid’s eastern face. It strikes the midpoint of the Sphinx. This ray also makes a golden angle with the north–south meridian at either point.

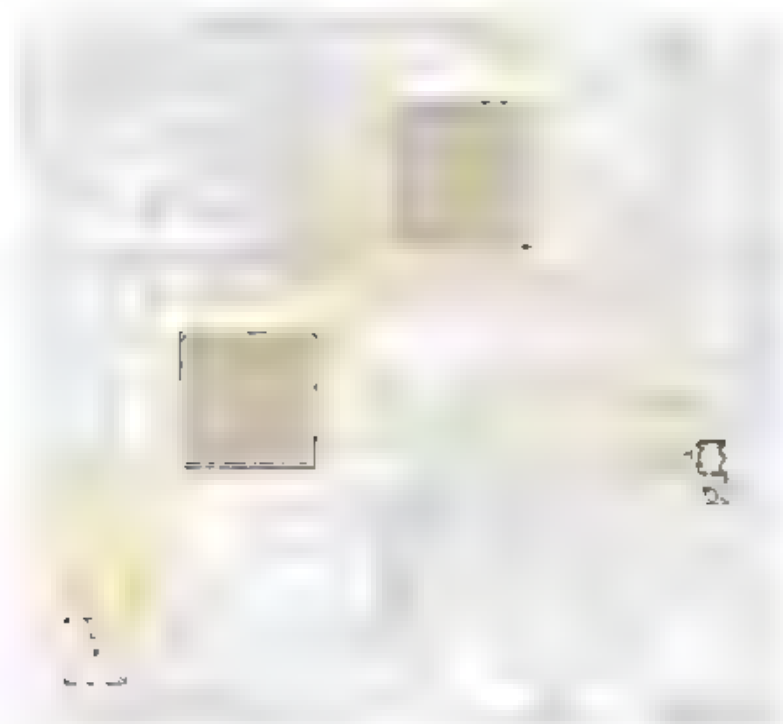


Figure 7.25 This is the Golden Giza Plan, which I worked out laboriously and with the greatest of difficulty. To achieve accuracy, it was necessary for me to work out these geometrical relationships using the official Egyptian government survey map, which is the black and white basis for this two-color diagram. The golden lines show what I have chosen to call the “rays” connecting the four key monuments. All of these rays share the same angle, the golden angle of  $26^{\circ} 33' 54''$ , which is the acute angle occurring in a golden triangle, a right triangle formed on the basis of the Golden Section. The ancient Egyptians were clearly obsessed with the golden angle and embodied it superstitiously in all of their sacred art and architecture. (*Drawing of the rays by David Sutton from my sketch, copyright by Robert Temple*)

The third defining ray emanates from the midpoint of the base of the Great Pyramid’s northern face. It strikes the southwestern tip of the Sphinx’s rump. This ray also makes a golden angle with the north–south meridian at either point.

These three defining rays fix the size and position of the Sphinx. A further defining ray emanates from the Pyramid of Chephren. A ray from the northwest corner of that pyramid parallel with the Chephren Causeway shoots through the midpoint of the Sphinx. (The midpoint of the Sphinx is thus an intersection point of two rays shooting from key points of the two separate pyramids. The latter ray also makes a golden angle, which is described in a moment.) The northwest corner of the Pyramid of Chephren is linked to the midpoint of the base of the Great Pyramid on its eastern face (a point from which a ray is emitted defining the Sphinx’s midpoint by a golden angle, as already mentioned), by a further golden angle, this time one made with the east–west line defining the northern face of the Pyramid of Chephren.

The midpoint of the Sphinx is thus one vertex of a triangle, the other two vertices of which are the northwestern corner of the Pyramid of Chephren and the midpoint of the eastern baseline of the Great

Pyramid. Each of these vertices is connected by a previous relationship based upon rays of golden angles.

In other words, there is a kind of interlocking grid of these rays whereby they seem to confirm each other by repeating the same golden angle each time. The ray emanating from the midpoint of the base of the northern face of the Great Pyramid also passes through the southeastern corner of that pyramid on its way to strike the Sphinx's rump at its southeastern tip.

If we look at figure 7.25, we can see that the midpoint of the base of the northern face of the Great Pyramid also shoots a ray toward the Pyramid of Chephren, which strikes it at the point where the southern edge of the Chephren Causeway, which I call the *base* of the Causeway, would strike that pyramid if continued. And this ray then makes a golden angle with the north-south meridian defining the base of the eastern face of the Pyramid of Chephren, yet another confirmation of an interlocking Golden Grid.

But there is something even more remarkable about this midpoint of the base of the northern face of the Great Pyramid: the two rays just described cross the southwestern and southeastern corners of the Great Pyramid, respectively, and in doing so they create a superimposed triangle upon the plan of the Great Pyramid that has as its vertex at the northern face a double golden angle (i.e., an angle that if bisected yields two golden angles). In other words, the rays both make golden angles at the vertex with the north-south meridian bisecting the Great Pyramid. No one has ever noticed before that the size and the distance of the base of the Great Pyramid are just right to do this. The same would apply to rays generated at any of the four midpoints: each would generate two golden angles with rays striking the appropriate corners of the pyramid. I have not bothered to show these on the Golden Giza Plan of figure 7.25, because it complicates the design too much with details that do not concern the Sphinx, however important they may be with regard to the Great Pyramid itself. However, the two descending rays from the midpoint of the base of the northern face show clearly what the other three midpoints also generate with their own pairs of rays, which are omitted from this particular diagram to avoid confusing the reader with too much information.

A large number of other golden angle rays exist that connect the four main monuments of Giza: the three main pyramids and the Sphinx. These demonstrate conclusively that the Giza complex was conceived as a unity and that the sizes and positions of the four monuments are rigidly determined by these sighting rays based upon what I call a Golden Giza Plan. In addition to this, we must remember that there is the golden-angled ray that actually shoots through the air from the floor of the Sphinx Temple, which strikes the peak of the Pyramid of Chephren, as already described in a previous chapter, discovered by me using a device called an inclinometer. And just to set the scene appropriately, we ascend on a golden slope rising at the golden angle up the ascending passageway of the Valley Temple to enter upon the Chephren Causeway and approach the plateau. Truly, Giza is golden!

Now we will look at some of the other golden rays of Giza, in order to explore further the rigidity and inflexibility of this geometrical structure created by some ancient designer or designers who was/were obsessed with golden angles. The three main pyramids at Giza are mutually fixed in their sizes and positions by a complex set of golden rays, as is shown in figure 7.25.

Another golden angle is the one made by the ray shooting from the southeast corner of the Pyramid of Chephren to the tip of the Great Pyramid. It makes a golden angle with the north-south meridian defining the base of the east face of the Pyramid of Chephren.

Yet another golden angle exists between the north-south meridian bisecting the Mycerinus Pyramid and a ray shooting from the tip of that pyramid to the southwest corner of the Pyramid of Chephren.

Another golden angle appears when we shoot a ray from the northwest corner of the Pyramid of

Chephren to the midpoint of the base of the east face of the Great Pyramid. This line makes a golden angle with the east–west line defining the base of the north face of the Pyramid of Chephren.

There are two more rays at golden angles connecting key points on the Great Pyramid with the tip of the Pyramid of Chephren (which was at a golden angle to the floor of the Sphinx Temple, as I have already described). If we shoot a ray from the northwest corner of the Great Pyramid to the tip of the Pyramid of Chephren, it makes a golden angle with the north–south meridian defining the base of the west face of the Great Pyramid. And if we then shoot a ray from the tip of the Pyramid of Chephren to the midpoint of the base of the east face of the Great Pyramid, we discover that it makes a golden angle with the line I have just mentioned.

Yet another golden angle occurs if we shoot a ray from the southeast corner of the Great Pyramid to the midpoint of the base of the west face of the Pyramid of Chephren. It makes a golden angle with the east–west line defining the base of the south face of the Great Pyramid.

Another ray shooting from the northwest corner of the Pyramid of Mycerinus to the midpoint of the base of the west face of the Pyramid of Chephren makes a golden angle with the north–south meridian defining the base of the west face of the Pyramid of Mycerinus. (The same line also obviously makes a golden angle with the north–south meridian bisecting the Pyramid of Mycerinus, which it intersects, and which itself is the base of another triangle with a golden angle, as already indicated, and additionally it makes a golden angle with the north–south meridian defining the base of the western face of the Pyramid of Chephren when it strikes it.)

Another ray shooting from the northeast corner of the Pyramid of Mycerinus to the northwest corner of the Great Pyramid makes a golden angle with the north–south meridian defining the base of the east side of the Mycerinus Pyramid. The midpoint of the base of the west face of the Great Pyramid shoots a ray to the midpoint of the base of the south face of the Pyramid of Chephren, which makes a golden angle with the north–south meridian that defines the base of the west face of the Great Pyramid.

A ray shooting from the midpoint of the base of the east face of the Pyramid of Mycerinus to the eastern edge of the tip of the Pyramid of Chephren forms a golden angle with the north–south meridian defining the base of the east face of the Pyramid of Mycerinus. That same ray then continues on to the northwest corner of the Great Pyramid, where it forms a golden angle with the north–south meridian defining the base of the western face of the Great Pyramid.

If we draw a straight line connecting the three key defining points of the Sphinx (northeast tip, midpoint, and southwest tip) and continue it slightly to the southwest so that it touches the southern edge of the Chephren Causeway (which I call the *base* of the Causeway), we see that it makes a golden angle with the base of the Causeway. It also makes a golden angle with the ray shooting from the northwest corner of the Pyramid of Chephren to the midpoint of the Sphinx.

A line drawn from the point where the Chephren Causeway's base, if extended, would strike the Pyramid of Chephren makes a golden angle with the north–south meridian defining the base of the east face of the Pyramid of Chephren when it shoots off to strike the midpoint of the base of the northern face of the Great Pyramid, passing across the southeast corner of the Great Pyramid as it does so.

We can thus see that the Chephren Causeway, which runs at a rather odd angle of about 14° to the horizontal (east–west line), is actually linked to the Sphinx by two golden angles and to the Pyramid of Chephren and Great Pyramid by one golden angle, so it is not as haphazard as it might superficially seem.

The following key points of the Giza pyramids are thus found to be mutually defined by a bewildering multiplicity of rays, or sighting lines, shooting out at golden angles.



- Great Pyramid all four corners, the top, and three midpoints
- Pyramid of Chephren: all four corners, the top, and two midpoints
- Pyramid of Mycerinus two corners, the top, and one midpoint

The decrease in number of salient midpoints in the progression 3, 2, 1 matches the degree of hierarchical size of each pyramid in the group.

We must not forget that the Great Pyramid itself is full of golden angles and golden triangles and golden sections. I have described them at some length in *The Crystal Sun*. The commencement of the Grand Gallery inside the Great Pyramid is, for instance, determined by a golden triangle. The Ascending Passage and the Descending Passage inside the Great Pyramid are both golden slopes, each at the golden angle of  $26^{\circ} 33' 54''$  to the horizontal plane. It was Petrie who specified this, for the interior slopes of the Great Pyramid are often given as slightly different than the golden angle value. A fuller discussion of this appears in *Egyptian Dawn*, with extensive detail and references and translations of key German texts that are unknown to English-speaking scholars. The fact that the Descending Passage was at this angle was first discovered in the nineteenth century by Henry Crichton Agnew (born 1797), whose largely forgotten work at Giza is discussed in *Egyptian Dawn*. The King's Chamber has multiple golden angles determining its size and shape. As I have already published diagrams elsewhere showing all of these things, I will not discuss them again here. However, for a full understanding of the golden angles of Giza, it is necessary to have a copy of *The Crystal Sun*. In addition to these, there are the eight golden angles manifested on the plan of the Great Pyramid by triangles described a few moments ago, only one of which is actually shown in figure 7.25 (the triangle drawn between the southwest and southeast corners of the pyramid and the midpoint of the base of the northern face).

You do not have to be particularly astute to see that the ancient Egyptians were clearly obsessed with golden angles to an extent that is mind-boggling to us today. It is as if they had gone mad. How could anybody who was not an obsessive-compulsive personality construct a design for the Giza Plateau such as this? All these monuments that had never before been recognized by us as having any coherent design connection with one another are seen really to be interrelated by a crazy array of rays shooting out at golden angles in every direction, which constitute a vast secret pattern that can be seen and plotted only on an official government geodetic survey map. It is such a crisscrossing spider's web that the concealed structure is hard to grasp. We have to remember that all these many rays are determined by *one identical angle*, repeated over and over again.

The question arises: *How did the ancient Egyptians do this?*

We may not know how, but it is easier to understand why. So we will now turn to that easier question, though in doing so things will become far weirder than fiction, so hold on to your *nemes* headdresses as we take off!

Before we can really comprehend what was going on at Giza, we have to stop to think for a moment: What was the golden angle? And how can you find it? After all, as it is not a whole angle but is 26 degrees plus slightly more than half a degree more, how did the Egyptians know about it in the first place? Were they really that sophisticated? I think a moment's reflection on the last question will permit anyone to answer a resounding "Yes!" Anyone who can build the Great Pyramid can certainly work out an angle in geometry!

As I explain later, the distinguished Egyptian historian of ancient Egyptian architecture, Professor Alexander Badawy, found incontrovertible proof that the Egyptians used a series of numbers that we call

the Fibonacci series in constructing their sacred temples. To prove this, he studied more than fifty ancient structures and measured them very carefully. The successive numbers in this series, as they get larger and larger, converge on a fraction (expressed by us as a decimal, 0.618, which is the decimal portion of 1.618, which is a universal natural constant also called *phi*) that expresses the golden section (which then gives the golden angle) in numerical form. (I call the decimal portion the “golden particle.”) All you have to do then is to apply the number to a geometrical line, and you have the golden section without the need to construct it geometrically. It is handed to you on a plate by the number series, a number series that we know they used. You do not even have to be a geometer to get the golden section! However, the Egyptians were also expert geometers, so they probably knew about both the number-series method and at least one of the geometrical methods.

One way to approach the problem of the golden angle is to go back to Euclid (a Greek who flourished 323–283 BC and lived at Alexandria in Egypt). He gives the method for cutting a line in the golden section in a rather ingenious and unusual way. This is found in Book Six of his *Elements*. Book Five of the *Elements* is concerned with defining and explaining what ratios and proportions actually are. In Greek, a ratio was a *logos* and a proportion was an *analogon*, which was a contraction of *ana logon*, meaning “in proportion.” (I have recently registered a website called [www.inproportion.org](http://www.inproportion.org), which will be devoted to “sacred” geometry, by the way. Check it out.) This fifth book of Euclid is actually suspected of having been written by a distinguished Greek predecessor, Eudoxus, and Euclid merely incorporated it into his compendium, as there was little or nothing that needed to be added or touched up. Definition 3 of Book Five states: “A ratio is a sort of relation in respect of size between two magnitudes of the same kind.”<sup>42</sup> Definition 6 states: “Let magnitudes which have the same ratio be called proportional.”<sup>43</sup> This may all sound very simple and obvious, but the Greeks were very thorough, and they did not believe in writing books about things unless they first defined what they were talking about.

Book Six then moves on to what concerns us. What we call the golden section was not called that then; it was merely called “the section.” But Euclid discusses it in a more fundamental manner still, and calls it “the extreme and mean ratio.” Definition 3 of Book Six states: “A straight line is said to have been cut in extreme and mean ratio [*akron kai meson logon*] when, as the whole line is to the greater segment, so is the greater to the less.”<sup>44</sup> Bearing in mind the second definition we saw from Book Five, we can realize that this comparison of two ratios means that we are dealing with a *proportion*. Hence we tend to call it today “the golden mean proportion,” though that is modern language adopted during the nineteenth century, not Euclid’s language. (In the Renaissance, it was called “the divine proportion.”)

The demonstration of how to find the golden mean proportion is then given by Euclid in Book Six, Proposition 30, which is called: “To cut a given finite straight line in extreme and mean ratio.”<sup>45</sup> Euclid then proceeds to go about it, draws a figure, and so on, in his usual way. What is so intriguing about the way he does this is that he does not follow the more modern methods at all, but approaches the matter in the manner of a man who thinks entirely differently from moderns. His method is incredibly simple when you read it, though how anyone discovered it in the first place is baffling, so one must presume mere trial and error. To summarize, what it amounts to is this: draw a square, then draw any parallelogram that shares a corner with that square and is equal to the square in area, and it will of necessity cut the square at a point that is the golden section of the side of the square that is cut. (The details of what a parallelogram is, and of how to make it equal to the square, and so forth, are all things that Euclid has dealt with earlier, so that the student marching his way through the *Elements* always follows a clear cumulative path of definitions and explanations and knows exactly what is going on at every step, like a baby led by the hand who is being taught how to walk.)

By way of illustration of Euclid's method, I reproduce in figure 7.27 the page from one of the most amazing books about geometry ever published, Oliver Byrne's *The First Six Books of the Elements of Euclid*, William Pickering, London, 1847. Because the book is so unusual, I am reproducing its title page also, in figure 7.26. Byrne pioneered a color-coded method of understanding geometry at the remarkably early date of 1847, and this is one of the rarest books on geometry in the world, of which I have been fortunate to obtain a copy. On my website figure 7.26, the method of Euclid for obtaining the golden section, is shown in full color. It would take too long to explain Byrne's system of color-coding, but the diagram on the left of the page shows the result very vividly. Maybe somebody will publish a reprint of this extraordinary book in full one day, as a copy should be in the hands of everyone with a true interest in such things.

Figures 7.28 to 7.30 and 7.32 reproduce diagrams showing more "usual" modern methods of determining the golden section. However, it is not necessary for me to go into further detail about these geometrical techniques; I merely wish to indicate them. Serious students of geometry either already know them or can easily find them in standard works of reference.

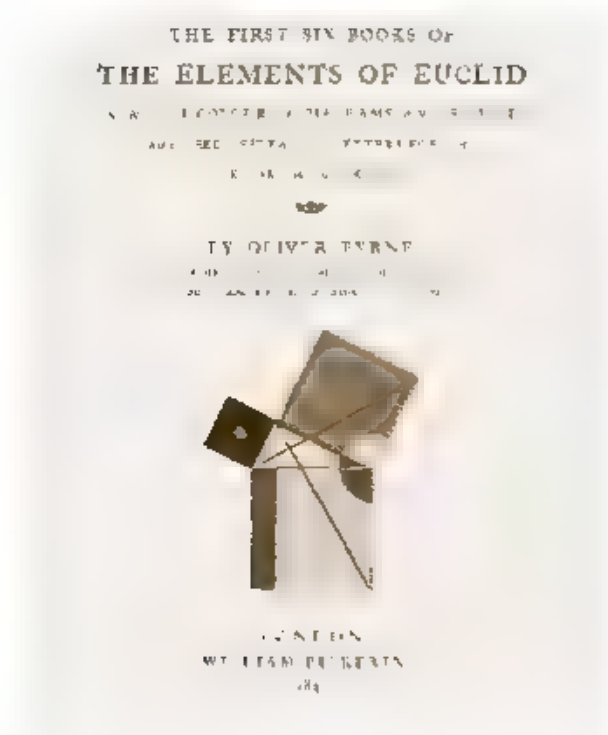


Figure 7.26. The title page of Oliver Byrne's innovative color-coded excursion into Euclid's geometry, which attempts to make the geometrical principles clear to people who are uneasy with equations and standard diagrams, by showing what is happening in different colors. Byrne's thinking was that artists would intuitively grasp the geometry if color was used in this way. His book was a monumental step in the history of printing for the mid-nineteenth century. (For a full-color version of this illustration, visit my website.)





Figure 7 29 Another method of constructing a golden section on a line. (Collection of Robert Temple)

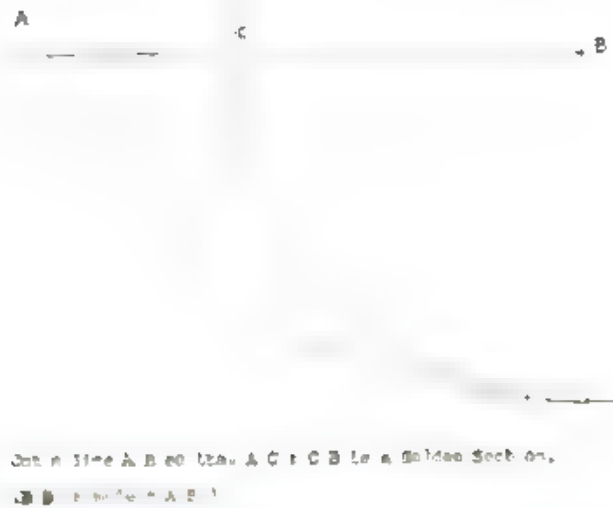


Figure 7 30 A third method of constructing a golden section on a line (Collection of Robert Temple)

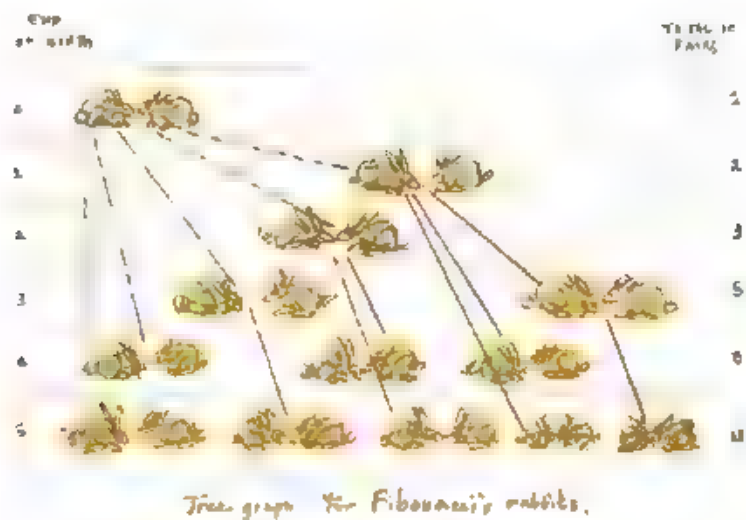




Figure 7.31 A drawing showing how rabbits breed according to the numbers of the Fibonacci series, which are related to the golden section. The Fibonacci-series numbers were used for the layout of ancient Egyptian temples, a fact proved by Professor Alexander Badawy (see page 381) (*Collection of Robert Temple*)

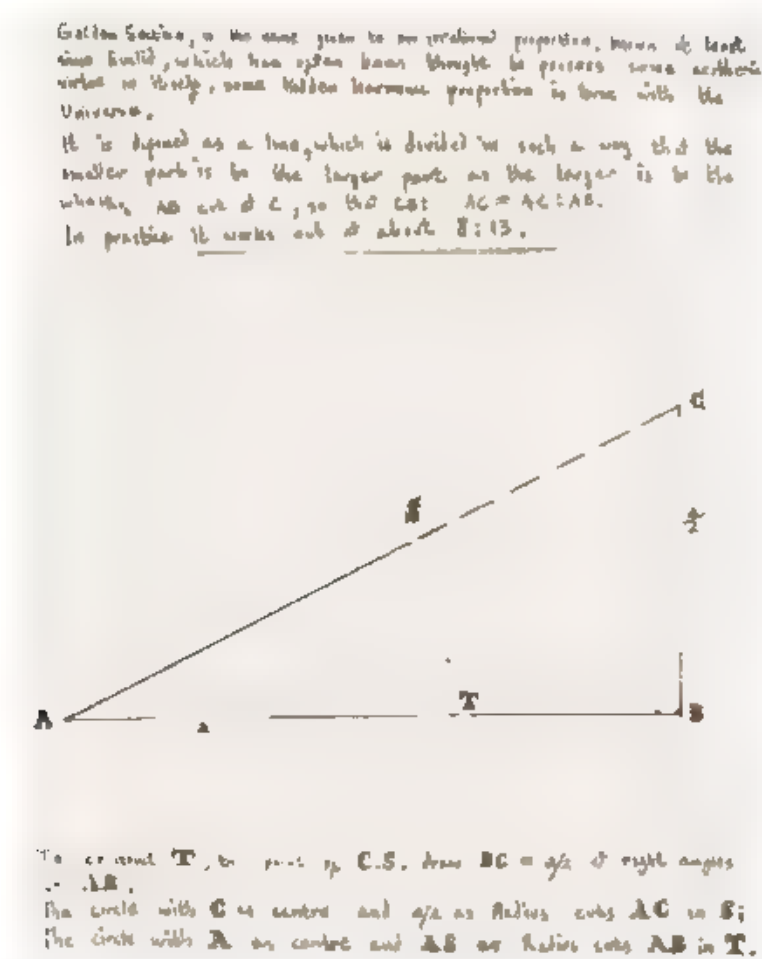


Figure 7.32 Notes and demonstration of the construction of a golden section on a line (*Collection of Robert Temple*)

I have given all the background that is found in Euclid to establish a more primitive approach to what we call the “golden” section, “golden” angle, “golden” triangle, and so forth, than is usual. Euclid derived his information from the Pythagorean, Aristotelian, and Platonic geometers and systematized their findings in a brilliant manner. His personal affiliation was with the school of Aristotle, though the Platonists like to claim him because they don’t want to let him get away. The Pythagoreans in turn got much of their geometrical knowledge from Egypt, which they freely admitted (Pythagoras lived there for some years, and after all, Euclid lived there for most or all of his life also), as well as from the Babylonian traditions. Looking at this from the point of view of Euclid in the fourth century BC, we are actually much closer to seeing it from the point of view of the earlier Egyptians themselves. Although it was the philosopher Thales of Miletus who was the first person to introduce Egyptian geometry to the Greeks, and he was earlier than Pythagoras, that is a detail people generally overlook, and we need not concern ourselves with it here.

So we see that the golden angle is really not so very difficult, and that the golden section that gives rise to it (when we form a triangle based on the golden section) can be obtained as easily as by drawing an overlapping square and a parallelogram! Therefore, let us not be intimidated by the fact that the golden angle has the bizarre value of  $26^{\circ} 33' 54''$ , which seems so—well, so . . . very messy and disturbingly fractional. The Egyptians loved fractions, as they had no decimal system, and they could calculate fractions so fast it was like lightning. (It is a bit like how a Chinese person can calculate faster on an abacus than a Westerner can on an electronic calculator, if they are sitting side by side, I have done such

competitions in China myself!) I have dabbled a bit in Egyptian mathematics, and it is a wonderful parallel universe of its own, so strange, so fascinating. (For instance, they had no multiplication or division, as these processes were done instead by addition and subtraction in a very bizarre manner ) But because of the way they did things, fractions were perfectly acceptable to them and could be handled with the greatest of ease and fluency. Thus their manic fixation on the golden angle is not as strange as it seems to us, since its fractional nature was no problem to them.

Let me restate what the golden section is in another way as well. We cut a line at a certain point (the golden section point, which we have found either according to the method of Euclid or by one of the other ways), and that divides it into two shorter lines: one is long and one is short. The long one is called the major and the short one is called the minor. The ratio of the short line (minor) to the long line (major) is the same as the ratio of the long line (major) to the whole line before it was cut; hence the two ratios are what is called “proportional.” And this proportion is known now as “the golden mean proportion,” but was known to Euclid as “extreme and mean ratio.” Leonardo da Vinci was obsessed with the golden section, or divine proportion, as he called it; his famous painting of the Last Supper, for instance, is based on its principles. The millions of people who have read the novel *The Da Vinci Code* will all be familiar with this. Few people realize that the golden section also entered music at the time of Monteverdi, and that Bach was so obsessed by it that he used it as the basis of the composition of all his fugues. Mozart also used the golden section in the composition of his music, as he was a great admirer of Bach. Anyone who wants to know more about that can go to our website, [www.brancusiclassics.com](http://www.brancusiclassics.com), and download the relevant papers by myself and my colleague the pianist and musicologist Stefano Greco.

It is worthwhile keeping firmly in mind that it is not only the ancient Egyptians who were maniacally obsessed with the golden mean proportion, but that such people as Leonardo da Vinci and J. S. Bach were as well. Indeed, so was the twentieth-century architect Le Corbusier, who embodied it in all his buildings just as if he were an ancient Egyptian. (And who can say, perhaps he was one.)

As mentioned briefly already, the golden section is connected with a series of numbers called the Fibonacci series (named after an Italian mathematician of the Renaissance called Leonardo Fibonacci, who discussed those numbers). I do not propose to give a full account of the Fibonacci series, or of Leonardo Fibonacci; that would be a distraction. All you need to know is that the series is a very simple one, where each number in the series is a sum of the two numbers that have gone before: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, . . . and so on (another name for this is a “summation series”). Know-it-alls of today think this is too complicated for ancient Egyptians. However, it has been conclusively proved by the Egyptian archaeologist Alexander Badawy that it was used in the construction of Egyptian temples throughout history. He studied more than fifty temples, took careful measurements, and published his findings in his brilliant book *Ancient Egyptian Architectural Design*.<sup>46</sup> Badawy is widely recognized as the leading authority on Egyptian architectural design and is also author of a work in three volumes, *A History of Egyptian Architecture*, which is the authoritative work in the field. (The information about the Fibonacci series is not to be found in those volumes, but only in his volume that is specially devoted to the subject, which appeared separately.) I have discussed his findings and especially their application to the temple of Seti I at Abydos in my lengthy account of our work and findings at that temple, which awaits future publication, so I shall not repeat any of it here. Suffice it to say that Badawy established conclusively that the Egyptians not only knew the Fibonacci series, which was based on the golden section (or, alternatively, the golden section derives from the number series, as it can work either way), but also that the Egyptians seem never to have built a temple *without* using it! Those who doubt me can turn directly to Badawy’s book for the evidence that he compiled over many years of painstaking research

in the field. It takes a long time to visit fifty monuments and measure them in detail, and he could do this only because he was an Egyptian, not just a visiting archaeologist from elsewhere.

I have not made a study of the possible use of the Fibonacci series at Giza. It was exhausting enough discovering all the golden angles and re-creating the forgotten design plan. I leave the Fibonacci aspects to others. I do not have enough time to spend weeks or months at Giza measuring everything the way Badawy did, nor would I be given permission to do so anyway under the present archaeological regime there.

In *Egyptian Dawn*, I carry the geometrical analysis of the Giza Plateau farther. In this book, I have attempted to restrict myself to aspects that have direct relevance to the Sphinx. In the next chapter, we take a “golden flight” into the realms of Egyptian mythology in order to try and group what all this obsession with golden angles was really about. The ancient Egyptians weren’t just a lot of idle nerds doing all of this for fun. To them, it was a matter of life and death.



## THE GOLDEN ANGLE OF RESURRECTION

I explained at great length in *The Crystal Sun* that the brilliant Norwegian architectural historian Else Kielland (niece of the famous Norwegian painter Kitty Kielland) had proved conclusively in her book *Geometry in Egyptian Art*<sup>1</sup> that the golden section was mandated for use in every sacred building and every royal work of art throughout the whole of Egyptian history, even from as early as the First Dynasty. I cannot repeat that discussion here. However, I give one of many examples from her book of her minute analysis even of small royal objects, such as the painted casket from the tomb of Tutankhamun showing the king as a warrior in a chariot. My photo of this casket is in figure 8.1, and in figure 8.2 is a reproduction of Else Kielland's geometrical analysis of its design on the basis of multiple golden sections.

Golden angles, golden sections, golden triangles, and the Fibonacci series of numbers generated from the golden section permeated Egyptian culture for millennia and were a full-fledged priestly obsession for all those thousands of years.

So why did they have to use them all the time? Fine, we know that they *knew about* them, but why the compulsion always to use them?

This is where we enter the ancient Egyptian mind. There was no word for “religion” in the ancient Egyptian language, and also no word for “belief.” They did not approach things the way we do at all. They did not have a sacred book in their hand and read from some text that told them how to think. They were not “people of the Book,” which is how Christians, Muslims, and Jews are often described. Anyone wishing to understand the ancient Egyptian mentality needs to get as far away as possible from the mind-sets of Christianity, Islam, and Judaism. The Egyptians were not doctrinaire, and they did not go to war over dogma. They would have thought the religious wars fought over the last two thousand years were insane, which of course they were. It is much easier to understand the Egyptians if you are familiar with Hinduism, Buddhism, or Taoism. Just as the Taoists' main idea is the *tao* (the Way) and the Buddhists' main idea is enlightenment through *buddhi* (the higher intuitive mind, which transcends the dichotomy of rational and irrational), so the Egyptians' main idea was Maāt, or Cosmic Order. The Egyptians wished always to follow Cosmic Order in the same way the Taoists wished to follow the Way. In both cases, the underlying idea was thought to be at the basis of the universal structure of everything. But whereas the Taoist Way was fluid and unstructured, the Egyptian Cosmic Order was highly structured and geometrical, so in that sense, the Egyptians and the Taoists were essentially the opposites of one another. Think of the difference between a young fellow in a T-shirt and a man in a dinner jacket: the first is like the Way and the second is like Cosmic Order. The Egyptians were highly formal. They were more interested in dress codes than the most exclusive American country clubs. Nothing casual was allowed. Furthermore, it was

all secret. The public was not admitted to the temples for the majority of ceremonies, for the simple reason that there was no “public” in any sense we would recognize today. The only people who were literate were the priests, scribes, and the royal family, and the royal family were all priests and priestesses anyway, as Egypt was a theocratic state. In the whole of Egypt, therefore, “culture” consisted of only a few thousand people at any one time, in addition to a few thousand more trainees and minor priests backing them up, who had some grasp of the lesser aspects of culture and a great deal of reverence. Everybody else living in Egypt consisted of “the people,” who had culture imposed on them from the top down. Self-expression in art consisted of little tweaks here and there where an artist might show a bit of individuality in interpreting some rigidly perfect standard work according to a totally strict canon. What any individual thought or felt was considered to be of no consequence when matters of Cosmic Order were involved. No one, not even the pharaoh, was allowed to be an individuated person in the modern sense. Modern people did not exist, because they had not been invented yet.



Figure 8.1. This decorated chest was found in the tomb of Tutankhamun and is on view in the Egyptian Museum in Cairo. It shows the young Tutankhamun charging in his battle chariot and firing arrows at foes which it is doubtful that he ever did. Such scenes were traditional for New Kingdom pharaohs, to whom smiting the enemy was part of the state pharaonic cult. Every pharaoh was meant to be the greatest and most fearless warrior in the world. Some pharaohs, such as Thutmose III, really were ferocious warrior pharaohs, but the teenaged Tutankhamun was certainly not in that category. There are multiple golden sections used in the construction of this dynamic and powerful design. The geometrical analysis of this image is shown in figure 21, which is taken from Else Kjaer's brilliant book, *Geometry in Egyptian Art*. It was Kjaer more than anyone else who comprehended the religio-philosophical depth and profundity of the golden section/golden angle obsession of the ancient Egyptians, and from whom I came to understand its true significance for the understanding of their culture. (Photo by Robert Temple)



Figure 8.2. This is one of a set of five geometrical analyses by Else Kjaer of the Tutankhamun chest in figure 8.1. Unfortunately, Kjaer's book, which was published in 1955, has extremely poor quality illustrations, so reproducing them is difficult. She points

out that both the vertical line  $GG'$ , which crosses the king's elbow, and the vertical line  $HH'$ , which goes through the horse's nostril and defines the front of its chest, divide the horizontal picture in golden section to the left and to the right. A ray shot down from  $H'$  at a golden angle strikes the baseline at  $O$  and makes a golden triangle. It is from point  $U$  on this line that one can draw two circles delineating the horse: the first, touching the bottom line of the strip ( $AD$ ), contains the essentials of the horse, touching the top of its head and left foot, and the second and larger circle contains the whole of the horse, touching the top line of the strip ( $BC$ ) and also the golden dividing line,  $GG'$ . From the top left corner of the strip, marked  $B$ , a ray shot down at a golden angle strikes the base of the picture at  $L$ , forming the golden triangle  $ABL$ . If you put your compass point on  $L$ , you can draw an arc that touches the center of the chariot wheel at  $Z$ . In the four analyses that follow in Kielland's book (which we cannot reproduce here), the unraveling of the geometrical basis of the design is completed, and various other golden angles are discovered within it. Kielland points out that all royal and sacred art was designed using rulers and compasses to exploit the golden angles, which determined the nature of a composition. There were usually multiple golden angles employed even in the smallest design, as a kind of golden spider's web, just as we find in the design for the Giza Plateau. It is clear that Egyptian architects, artists, and craftsmen working on the design of sacred or royal art or architecture were all trained to work like this. The purpose was to honor Maât, Cosmic Order, and to imitate the sacred design of the cosmos, so that what was below would be the same as what was above.

People generally assume that the Egyptians had a bewildering array of gods. In fact, those gods were not as firmed up as, say, the Hindu gods. Egyptian gods could blend into one another and frequently did so. No god was safe from being co-opted to become part of another god. They were often as interchangeable as football players, but imagine football players exchanging arms and legs and jockstraps as well, and doing it all on the field in the middle of the game!

All those animal heads were symbolic in a more profound sense than we tend to think of symbolism today. Just because Thoth had the head of an ibis in most pictures, we must not assume for a moment that any Egyptian ever imagined that Thoth *really* had an ibis head. In this sense also, the Egyptians differed greatly from modern people. When Christians show pictures of angels with wings, they tend to believe that angels really do have wings. The first angels with wings were the Egyptian goddesses. I reproduce one in figure 8.3 as an example. No Egyptian truly believed that these goddesses really had wings, whereas many Christians truly believe that their angels do. That, then, gives you a feel for the difference in mental attitude.

Nothing could be further from the ancient Egyptian viewpoint. Doctrines varied as you went from city to city and temple to temple. The pharaoh could perform ceremonies in one tradition at one site and could perfectly happily perform different ceremonies in a different tradition at another site shortly afterward. No contradiction was seen in this, because the ossification of religious observance into a single form, fanatically adhered to without variation, was unknown at that time. Attitudes requiring monochrome belief are the psychotic perversions of later literal-minded and decadent cultures.



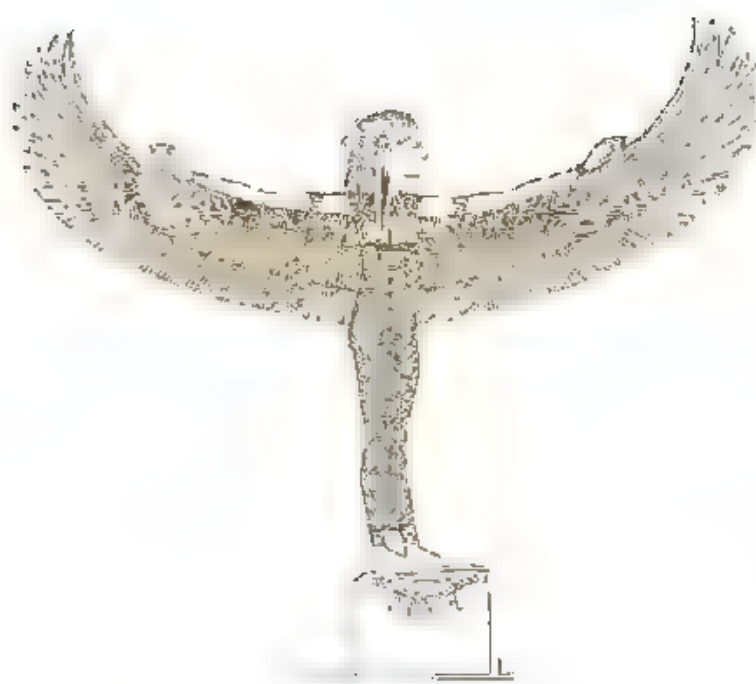


Figure 8.3 “An angel with wings” as portrayed by the ancient Egyptians, in this case Nut, goddess of the night sky. Over the past two thousand years, under the influence of doctrinaire “sacred texts ” we have lost much of our capacity for symbolic thought and have developed unnatural habits of attempting to impose a ridiculous precision and specification on images that are meant to be merely suggestive. The Egyptians were not so stupid. The tradition of winged figures like this spread to the Greeks and was particularly prevalent among the Etruscans, thus influencing the Romans. It was from these sources that the highly conventionalized “angels” of Christianity derived.

It is necessary to be aware of this when considering the rich mythological lore, involving several apparently coexisting and even interpenetrating deities, which we will find connected with the golden-angle beliefs. At the same time, we must always keep in mind that beneath the fluid surface there was an immovable and invariant certainty: the all-encompassing Cosmic Order, which was the only thing that really mattered.

The Egyptians were very worried by death, more so than some other cultures (Buddhists don’t worry so much because they know they will be reincarnated.) Resurrection was therefore another of the Egyptians’ manic fixations: everything revolved around this obsession. The body, which was called the *khāt*, had to be carefully mummified and preserved as an artifact, not because it would be resurrected itself, but because it acted as a focus for two of the spiritual aspects of the dead person that would survive death. If the *khāt* was interfered with, or if it was interred in a foreign land, this would cause serious trouble and destabilization. The “spiritual double” of the person, or his *ka*, survived, but needed to be near the *khāt*. The “spiritual force” of the person, called his *ba*, also had to come back and flit round the *khāt* from time to time. The *khāt* was thus both necessary and unnecessary at the same time, rather like one of those front rooms in an English working-class home that is never used by the occupants but is reserved for visitors who come once or twice a year.

The *ba* was depicted as a human-headed bird to indicate that it was always flying around and was not constrained by place. Gods could have more than one *ba*, but then they would, wouldn’t they? The best thing that could happen to a person after death was to get lucky and become an *ākh*, which meant a glorified spirit who survived in what we today might call heaven. Then you were really okay. But, of course, for that to happen to you, you first had to go to the netherworld and be judged and escape countless ambushing demons who wanted to destroy and annihilate you. So it was all very scary. The Egyptians had a far more nightmarish vision of what we call hell than we do. The terrible things that could happen to you there were beyond our modern imaginings. Another preoccupation of the Egyptians

was snakes. Snakes were everywhere. Of course, Egypt was and still is infested with cobras and sand vipers, both of which can kill quickly. It is hard to see a sand viper in the desert; you can step on one without noticing, and that is it. As for cobras, they always turn up just when they are not wanted, but they were especially hazardous in crypts and underground passages and hence troublesome to priests. It was natural for the Egyptians to think that if the surface of the earth was infested with snakes, the netherworld must be more so. After being decapitated, the evil dead then had the indignity of snakes crawling all over them in subterranean snakepits, and the snakes also chewed on them, just to add insult to injury.

There were friendly serpents, however, that were guardians in the netherworld. Presumably on the principle that it takes a snake to guard against a snake, friendly snakes were common because they were needed in such numbers. A massive snake called the Enveloper (Mehen) protected the sun god himself as he made his way through the netherworld every night. The Enveloper wrapped him up as tight as cellophane so he would be fresh in the morning. On the other hand, the most evil of all beings was a giant snake, called in Egyptian Apep and in Greek Apophis. He lived mostly in the netherworld, but he was also in the sky. It was his job to want to destroy everything, to wreck the boat of the sun god so that he could not rise in the morning, and to bring the entire cosmos to destruction. He was the ultimate enemy of Cosmic Order, and one had to struggle against him constantly. The equivalent of Apep in modern terms is Satan, or Samael, who is often thought to have serpentine aspects, specifically lower appendages in the form of snakes instead of legs.

There was, however, one genuine “snake with legs” that was plentiful in ancient Egypt, though it is bordering on extinction there now. I am referring to a North African skink, which is actually a lizard (family Scincidae). There are 1,200 types of skink in the world. But in the Menagerie of the Jardin des Plantes in Paris, Olivia and I were fascinated to observe the type that was once plentiful in Egypt. This type of skink looks so like a snake with legs, just as depicted on some of the Egyptian tomb walls, that Olivia suggested it was precisely what was being depicted in the tombs. (See figure 8.6 for an example.) We stood and watched these skinks for some time, and we noticed that they love to burrow in the sand, leaving only the tip of a tail sticking out. Since these skinks are tunneling creatures who burrow under the sand and stay there for long periods, they must have been seen as having a particular relevance to the netherworld and to the passages of the subterranean tombs constructed by the Egyptians. The Egyptians had not perfected the science of zoological classifications, so it is probable that they did not class skinks as lizards but instead as snakes-with-legs. And as such, the creatures would naturally have seemed to have the most special symbolic significance as denizens of the netherworld.

The third type of netherworld snake in Egyptian mythology is the symbolic snake. These were sometimes shown as the uraeus on the pharaoh's brow, or seen standing vertically on the tips of their tails, like ballet dancers en point. The vertical ones are often called Nehep snakes, from the verb meaning to leap up, which was a euphemism for resurrection, since resurrection was always associated in the Egyptian mind with the leaping of the resurrected sun over the horizon every dawn. These Nehep snakes are common in the netherworld depictions. Figure 8.27 shows one in a crypt of Denderah. It was not imagined that Nehep snakes existed any more than unicorns do, but they were very useful to get ideas across. Nehep also means to leap up early (or get up early, as we would say) to adore the rising sun.<sup>2</sup> Strangely, the Nehep serpent seems somehow to have survived as a motif into the Middle Ages, when it was adopted as the crest of a princely Hungarian family named Bethlen (see figure 8.7, a photo Olivia took of this crest carved in stone at their castle in Transylvania).

Now we come to the main mythological motif connected with the golden angles at Giza. Not surprisingly, it was a resurrection motif. Many people are familiar with the giant woman arching over

certain scenes in Egyptian art, named Nut, who was the goddess of the night sky. She had stars along her body. She swallowed the sun into her mouth every night, and he emerged from her vagina every morning (see figure 8.8). The Egyptians were not shy about discussing and depicting the genital organs and did not consider them rude or shameful; they were rather inclined to flaunt them. Concepts of Puritanism were as alien to the ancient Egyptians as air is to the moon.



Figure 8.4. The mummiform Osiris in his netherworld shrine and the Earth god Geb at right and the netherworld god Sokar (Sokaris) at left are all jointly rising at the horizon, while over them is held by two solar *ba* spirits the stretched-out length of the evil serpent Apophis—enemy of the sun—whose head has just been severed by a knife. By the slaying of Apophis, victory and resurrection have been achieved, as the sun rises, with the dead Osiris shortly to become transformed into the living Horus. This is figure 127 on page 375 of vol. 1, Alexandre Piankoff and N. Rambova, *The Tomb of Ramesses VI*, Bollingen Series vol. XL.1 (New York: Pantheon Books, 1954), 2 vols.

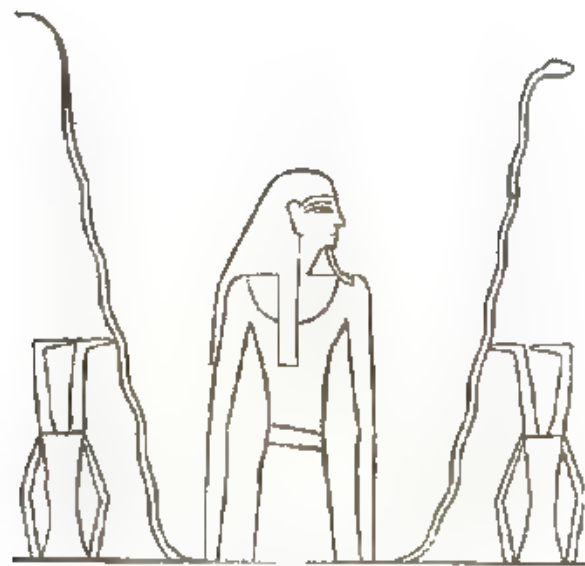


Figure 8.5. Here we see yet another view of the giant Osiris rising at the horizon from the netherworld. He is emerging from the coils of the evil serpent Apophis (the Coiled One), showing that life and resurrection are again made possible despite the attempt of Apophis to prevent them (Apophis was the Egyptian equivalent of Satan). The two upside-down figures are each called "the gory one" and represent the decapitated spirits of the evil dead who are in the process of being annihilated in the netherworld. This is figure 27 on page 130 of vol. 1, Alexandre Piankoff and N. Rambova, *The Tomb of Ramesses VI*, Bollingen Series vol. XL.1 (New York: Pantheon Books, 1954), 2 vols.





Figure 8.6. The goddess Neith, wearing the red Crown of the North, stands at left, apparently signifying a northern entrance to a secret passage into the netherworld. The descending passage, which is probably meant to represent the entrance to a pyramid, commences directly over her head. A sarcophagus is depicted as sliding down the passage, though it is shown above the passage so as not to suggest a permanent blockage. (The Egyptians often did this kind of wonky depiction, as perspective realism was not the intention in mythological drawings. Lakes, for instance, were always drawn in plan as if looking down on them from above, even though the figures beside them might be shown in profile as if we were standing beside them. Egyptian sacred art was always a many-viewed totality, and what was being portrayed was never shown only from a single observer's perspective point. The psychology was that the observer was not considered important, which is the precise opposite of the modern Western attitude, which regards the observer as all-important.) This wall painting is in the tomb of Rameses III in the Valley of the Kings, and it has apparently never been reproduced or even discussed before. Such paintings, although of New Kingdom date, derive from images found on old papyri that date from many centuries earlier. Many visual and even textual references to Giza (by this time a largely abandoned necropolis) survive in these New Kingdom pictures, owing to the conservatism of the Egyptian priests and despite the fact that they may have ceased to realize their origin and their original significance. Neith is speaking in a friendly fashion to an enormous netherworld serpent with human legs and a human head, who has a goatee and a skullcap. This is not one of the dangerous and evil serpents of the underworld, such as the horrible demon Apep, but a friendly one who takes his name from the Egyptian word *tep*, which means head. He is called *Tepi-sau-medjen*, which means "he with a head who guards the way." We can call him *Tepi* for short. *Tepi* was a particularly helpful chap to have around because, like many of the benign netherworld denizens, he emitted light, which made it easier to see in the dark passages. This painting in the tomb of Rameses III is a scene from *The Book of the Hidden Chamber*, showing the entrance to the netherworld at Rostau (Giza). It is possible that the artists who painted this in the tomb near Thebes had never seen Giza and had not the slightest idea what was being referred to in the images. The passage in this painting has the number three written in it, and the same number appears beneath *Tepi*'s chin. Neith was an extremely ancient Egyptian deity whose importance goes back to predynastic times. She was said to weave the shrouds for the dead and to protect them. (Photo by Robert Temple)



Figure 8.7. This is the heraldic crest of the Hungarian princely family of Bethlen. This particular plaque was erected in the seventeenth century by Prince Alexius de Bethlen at his Transylvanian castle at Kresch (now called Kris in Romanian). The ancient Egyptian Nehep serpent symbolizing resurrection, the serpent standing on its tail and springing into eternal life, has

somehow survived here, having been adopted in the Middle Ages as a family symbol by the Bethlens. In this instance the serpent wears a crown and holds in its mouth an orb surmounted by a cross, symbolizing holy power. Probably this motif survived from antiquity through secret organizations such as the Freemasons. The Bethlens recently reclaimed this half-ruined castle from the Romanian government in restitution for its illegal seizure from them in 1947 by the Communist regime. Unfortunately, the vast library of priceless old books that had been accumulated in this castle for centuries was taken out into the courtyard and burned by the fanatical commissars as decadent bourgeois literature, and not a single volume survived. (Photo by Olivia Temple)

Few people realize, however, that Nut was not the only giant figure in Egyptian mythological art. In figures 8.9 and 8.16 to 8.19, we see the giant male deity who was depicted only in netherworld scenes. He was Osiris rising as the sun god Re (also sometimes spelled Ra) at the horizon every morning. He had to be huge, because his feet reached all the way down into the very bottom of the netherworld, while as he rose above the horizon, his arms touched the sky. The most interesting and informative study of this giant deity is a book written by John Darnell of Yale and published in 2004 with the rather lengthy title of *The Enigmatic Netherworld Books of the Solar-Osirian Unity*<sup>3</sup>. It is a huge book of 640 pages and is not light reading. It has a price nearly as large as the title. The author also occasionally lapses into German (you have to know that *Normalschrift* means noncryptographic, etc.). Much of it is written for specialists, consisting of lengthy analyses of the cryptographic inscriptions in tombs (because he has to justify to his colleagues his choices of translation), and also the inscriptions on the Second Shrine of beaten gold found in the tomb of Tutankhamun. Anyone who really wants to know about these things needs Darnell's book, and a great deal of time. Because it is inadequately indexed, I found myself forced to memorize rather more of it than I wanted to, because there was no way to refer to many things in it otherwise, as I rarely write notes when I do research. I found it necessary to read Darnell's book many times, because the material is so utterly bizarre that you just have to keep reading it until the bewilderment vanishes. It is like getting used to drinking retsina; you just have to keep at it, and then you like it.



Figure 8.8. Detail of a painting of the goddess Nut, goddess of the night sky, as portrayed in the tomb of Rameses IX in the Valley of the Kings (Photo by Robert Temple)



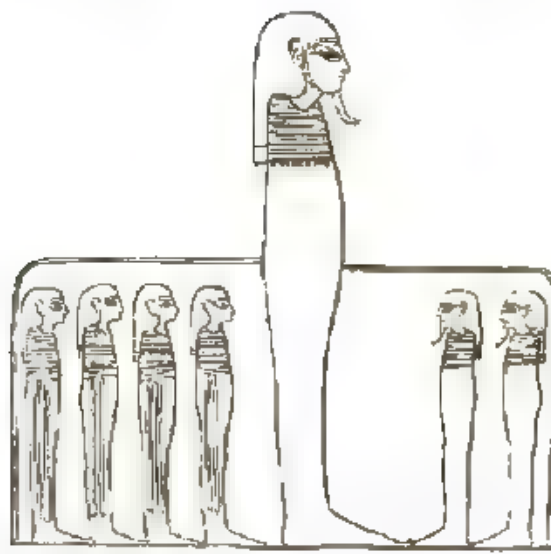


Figure 8.9 The giant figure of Ra-Osiris rising from the horizon is here “showing his body” as he rises, having burst forth from the restricted space of the netherworld, where the bodies of the blessed dead are found. The text says of them “These souls pass after him while their bodies remain in the mounds.” This is figure 88 on page 328 of vol. 1 of Alexandre Piankoff and N. Rambova’s *The Tomb of Ramesses VI*, Bollingen Series 40:1 (New York: Pantheon Books, 1954), 2 vols.

I would have thought it more elegant to call the giant deity “Osiris as the Sun,” but Darnell wants to call him Re-Osiris, so who am I to disagree? It is less clumsy than “the Solar-Osirian Unity,” a name he also uses. The symbolism is very thick here and involves multiple gods all merging, so you need to keep your head. Explaining what is going on can almost read like a cast list at the theater. First, there is Re, and that is the name of the sun in general, and especially of the daytime sun, whereas his other names are of his specific aspects. For instance, when he is rising, Re is also called Khepri (also sometimes spelled Khepera), which is the name of the scarab beetle, or dung beetle. The symbolism of this is that real dung beetles push spherical balls of dung larger than themselves for long distances over the desert floor. So the Egyptians thought it would be appropriate to adopt this as the symbol of the sun being pushed up over the horizon at dawn. No one imagined that there really was a giant dung beetle doing this; it was all symbolic. In speaking of this, one could also call the sun Re-Khepri, which was another way of saying “the rising sun.” In the various depictions in figures 8.10, 8.12, 8.17, 8.37, 8.43, and 8.45, there are Khepri beetles beside the solar disk, and this is what they mean. The setting sun was an aspect of Re called Atum, which was the name of the creator god. Hence the sun was often called Khepri-Re-Atum. That may sound like three gods in one, and it is. But let’s not get into arguments about the nature of the Holy Trinity.

As if that weren’t enough suns, we also have Osiris as the sun and his son Horus as the sun. In addition, we have not just one *ba* of the sun, but several. The main *ba* of the sun was depicted as a man with a ram’s head standing in the middle of the solar disk. But the sun could have extra *bas* when he needed them. As they represented emanations of the solar force, it is understandable that he did not have to be restricted to one. He also had an eye that roamed around, two eyes that did not roam around but simply gazed, and so forth. But there is no need for us to examine all the things the sun could do: for us, his journey at night and his rising are enough.

What concerns us at Giza are specifically the solar connections of Osiris and Horus. In a sense, Osiris was the netherworld aspect of Re, as he was always represented as a mummy who was king of the netherworld, and so in a sense, when he entered the netherworld, the sun became identified with Osiris in a spiritual manner. Gods are such highly advanced beings that they can become one another sometimes without worrying about it. Then they can separate again with no hard feelings. All this could even take place without the need for sex.

One might wonder how and why the sun would want to become spiritually united with a boring, smelly old mummy. To the Egyptians, however, all important mummies could be revived. Although one's physical body had to stay behind, the *ba* of one's mummy could be awakened, could fly forth and follow the sun as a member of the divine entourage. In this sense, the Egyptians claimed in their mythological writings that the "deserving dead" were revived and brought back to life by streams of solar light shooting at their foreheads or into their mouths. The sun "spoke light" (in the tomb of Rameses VI we find the statement about the sun that "his speech is light"),<sup>4</sup> and the sun's "word" (an idea that the later Greeks borrowed in their concept of the *Logos*, "the Word," which also passed into Christianity through Egyptian Gnosticism and Neoplatonism) brought resurrection to the dead. See figures 8.38 to 8.41.

So a parallel myth to that of Khepri-Re was the myth of Re-Osiris, and in a sense they were the same, so much so that Khepri was always shown preceding Re-Osiris in the netherworld drawings. We have to keep in mind that gods were not exclusive as far as the Egyptians were concerned, and were not necessarily real either. It would be more correct to say that Khepri was a motive force than that he was any kind of actual god. Khepri was not offended at being relegated to the status of a visual aid, because he did not exist anyway. He was only a pretty picture (if you like beetles).

That leaves us with Re-Osiris. What was he/were they? Here the symbolism gets really thick. The concept of the golden angle becomes part of the symbolism too, although that has not been recognized before. It will become clear to us that the golden angle was viewed by the Egyptians as symbolizing resurrection, and that it represented the transformation of the dead Osiris into his living son Horus in the person of the rising sun. Once we understand that, we can begin to comprehend why Giza was a mass of golden angles. As the ultimate necropolis of the Egyptians, it was important that it be magically replete with the power of resurrection conferred on it by having an invisible pattern on the sand of the resurrection angle endlessly repeated, like a mystical chant that never ends. And the Sphinx was fundamental to this, for as the guardian and watchdog of the necropolis, protecting entry to this magical land of the West, Anubis faced due east and every morning viewed the recurrence of the miraculous phenomenon that the Egyptians called Horus-in-the-Horizon. The most important occasions were, of course, the spring equinox and the autumn equinox, for on those days, the sun rose precisely at the center of the horizon and looked the Sphinx directly in the eyes (both when he was Anubis and when he later became Amenemhet II, for both of them have two eyes, whatever else they may not have in common).

What was Horus-in-the-Horizon? It sounds impressive, but was it anything but words? The Egyptian priests were eminently practical people, and they worked out a very precise mythological symbolism and explanation that tied together many of their preconceptions and expressed everything. To understand it, one has to understand their magico-symbolic mode of thought. Just as they might intone prayers every morning to a beetle in the sky without believing there really was a beetle in the sky, they envisaged this giant being standing in the horizon with his feet in hell and his head in heaven and called him Re-Osiris, or Khepri-Re-Atum, or whatever you like. They were not literal-minded. Today, in a culture stripped bare of all magic and symbolism other than that which represents money (a yacht is now a symbol, and so is a Rolex watch), it is difficult for us to imagine how Egyptian priests thought. They did not want to get rich, because there was nothing they could buy. But they did want to live forever. So their priorities were different from ours. They were also fearful that if they became evil, they would not survive, because they were convinced that the evil dead met with the most horrible of fates, culminating in annihilation. They were careful to preserve their purity by washing themselves fastidiously every morning, observing endless ceremonies, washing their statues daily, singing hymns, and generally being good boys. They were always up before dawn because it was a necessary act of politeness and respect for them to welcome the

sun's return. They were like butlers greeting the master when he returns home. They avoided various foods that might be taboo, such as certain fish. And among the other things they pursued with the same manic obsession was sacred geometry. It had to be embodied in everything that was sacred. Otherwise, the magic might be lost, a terrible sacrilege might be committed, and Cosmic Order might be defied, which would bring retribution. "Just to be on the safe side," they might say, "we had better add a few more golden angles." So there could never be too many. And Giza is the proof of that mentality.

Now we come to the rising sun as expressed in both mythology and geometry at the same time. If we look at and figures 8.11 to 8.13, which show the same scene, we see one of the most famous of the "leaning pharaohs" in Egyptian art. This is a picture of the deceased pharaoh Rameses IX, who has "become Osiris." All pharaohs when they died "become Osiris" simply by the process of mummification. It was what all the ancient texts said: "He has become Osiris." But since every pharaoh was an Osiris, there were rather a lot of Osirises, and it is only in the mode of symbolic thought that you can avoid the clutter of having a lot of look-alikes wandering around the netherworld all claiming to be the same god and getting into fights with one another. Once again, we must realize that the Egyptians did not *really* believe that each pharaoh "[became] Osiris"; what they believed was that each pharaoh became *an* Osiris. This was a symbolic expression. Christians who take communion and eat the bread and drink the wine "partake of Christ" and become one with him. Or at least, that is how they express it. Christians do not take "being one with Christ" literally in the sense that they have *become* Christ; they mean it symbolically and also in the sense of *mystical participation*. Being "one with Christ" is a bit like falling in love: you remain yourself, but you "become one" with the beloved. Similarly, the dead pharaoh "become[s] one with Osiris." I hope that explains it sufficiently.

Now to return to Rameses IX, who has become *an* Osiris. There he is, raising his arms and stretching himself out at a peculiar angle. This drawing occurs on what is called the Enigmatic Wall in his tomb in the Valley of the Kings, on the right as you go down. The entire wall contains strange drawings relating to the netherworld and texts that are written in cryptography. Anyone who was above the rank of junior priest could read cryptographic hieroglyphics, and it may be that the chief reason for using them was to conceal the true meaning of the inscriptions from the tomb painters, who had not been initiated and were not worthy to read what they were painting. In Egyptian cryptography, every sign means something other than what it normally means. Not all cryptography has been deciphered by modern scholars (and there are a few instances of a super-cryptography that cannot be cracked), and they are still arguing about it. However, in most cases, the texts can be read with tolerable reliability. Naturally, the number of people in the world who can actually do this today is remarkably small. You don't get your yachts and Rolexes that way, although in a just and philosophical world, the tycoons would have to hand over their yachts and Rolexes to the people who can read ancient texts, which is more difficult than making money.

The angular pharaoh Rameses IX is a drawing I have already reproduced and discussed in *The Crystal Sun*. But at that time, I carried the discussion only so far. I explained that he was at the golden angle. But now we have to consider what it means for a pharaoh to be at a golden angle, for that is fundamental to an understanding of Giza. This will also bring us to the strange subject of Christ on the cross.

The golden angle occurs at the top of the triangle formed by the leaning pharaoh. The vertical line is in this case the base of a triangle and the pharaoh is the hypotenuse. (A hypotenuse is a right-angled triangle's longest side, which is opposite the right angle.) That is why I call such figures, of which there are many in Egyptian tomb paintings and papyri, "hypotenusal pharaohs" or "hypotenusal Osirises." Such figures are always hypotenuses of triangles (and if drawn correctly, of golden triangles), even if the other



lines are not drawn. In this case, however, the other lines are very clearly drawn. And in the drawing of Rameses IX, just to emphasize the true meaning, the other two sides of the golden triangle are inhabited also by a friendly Nehep (sometimes called Neheher) snake, who, as I explained earlier, symbolizes resurrection. This pharaoh, like all hypotenusal pharaohs, is in the process of being resurrected. If you ever die and want to come back to life, it is very easy. All you have to do is become a hypotenuse.

Another feature of Rameses as a hypotenuse is that he is what is called ithyphallic, that is, he had an erect phallus. It has been largely rubbed out by prudish Victorians, or Copts, or Muslims, or whatever. Many of the phalluses have been hacked off the images in Egyptian temples and tombs because of the hypocrisy of most human societies, which prefer to ignore the existence of the genitals in public while overindulging them in private. So today's computer hackers were once preceded by avid penis hackers.

The Egyptians were very happy incorporating penises and vaginas into their sacred art. They would not have draped a loincloth over the crucified Christ. People of high symbolic rank are often assumed to have transcended the material requirements of ordinary life and not to have genitals, for instance. But as I have already said, the Egyptians were immensely practical. Perhaps they did not need to disguise physical details because they already had enough symbols as it was, without transforming the body into one by stripping it of its genitals.

The obvious procreative power of the erect phallus was a symbol to the Egyptians not only of fecundity, but also of creation itself, and, consequently, of resurrection. If you are a dead pharaoh and you are turning into a hypotenuse, it is only natural that you should get so excited that you have an erection.

Rameses IX was a rather late pharaoh, as the New Kingdom in Egypt was drawing to its close. So his artists got it a bit wrong. They knew he had to be portrayed as a hypotenuse, and that the golden angle must be used, but they put the golden angle at his hands, whereas it is really meant to be at his feet. They had lost the plot by this late period. As we see in our other illustrations, the whole point is that the golden angle generates the image, and it occurs at the feet. As time went on and the traditions were grasped less adequately, many of the priests became alarmed. There is a pathetic hieroglyphic inscription from Roman times, when things really were coming to an end finally and completely, where a priest says in his funerary testament, in desperation. "Set your hearts on what is therein [the texts of the stele]; do not forget the text collection; make copies of it; adhere perfectly to the text."<sup>5</sup>

Darnell quotes this sad example of what happens when things fall apart and the young priests don't listen any more. However, even though things were a bit wonky in the design, the picture in the tomb of Rameses IX is very striking. Notice that the beetle Khepri is practically crawling up the pharaoh's nose. This is to remind us that we are talking about the rising sun here, just in case anybody was inclined to forget. Unfortunately, this magnificent image is now behind glass with some rails in the way as well, so a decent photograph has now become impossible. I reproduce my photo through the glass in figure 8.11, which is inadequate, but one cannot really do much better than that nowadays. At the same time, I reproduce an old black-and-white photo from earlier and happier days as figure 8.12.

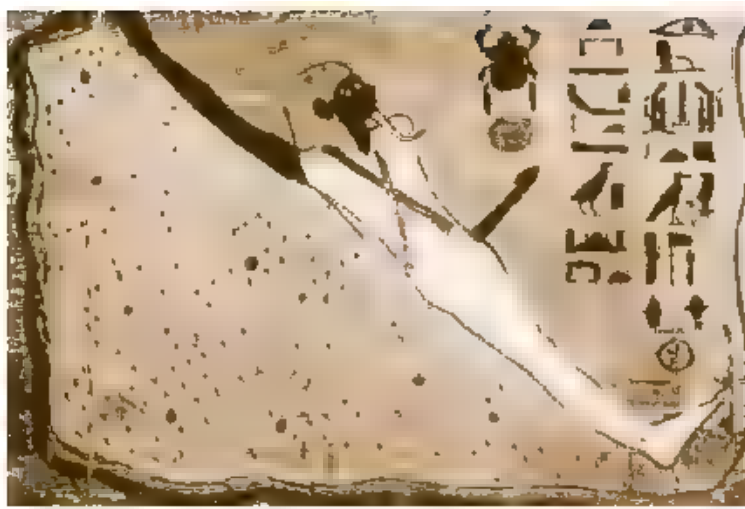


Figure 8.10. A highly aroused hypotenusal Osiris depicted on the Papyrus of Heruben B. We see here the deceased Osiris as a hypotenuse, and directly over his erect phallus we see the beetle Khepri and the globe of the sun, indicating the rising sun, which rises and is reborn from the power of Osiris's fecundity, which is his power of resurrection. A protective Mehen serpent (the Enveloper) constitutes the base and altitude of this triangle, which is crudely drawn. The triangle itself is filled with sand, suggesting the sandy region of the netherworld, which is a reference to Giza. The coded reference of the triangle being on the sand is a way of indicating the many golden triangles "on the sand" that constitute the Giza Golden Plan, though whether this was still consciously understood by the time this papyrus was painted just after the time of the New Kingdom is doubtful. The Papyrus of Heruben B, in the Egyptian Museum in Cairo, is the second of two papyri that once belonged to the Chantress of Amun-Re, Heruben (Resplendent Sky), granddaughter of King Menkheperre of the Twenty-first Dynasty (tenth century BC). A line joining the tip of the penis with the tip of the nose makes a golden angle with the horizontal, as does a line joining the tip of the toe with the bend in the serpent's neck, which is the top of the triangle's altitude. This is a detail from plate 2, a folding plate in volume 2 of *Mythological Papyri: Egyptian Texts and Representations* by Alexandre Piankoff and N. Rambova, Bollingen Series XL.3 (New York: Pantheon Books, 1957).

Because the drawings beside Rameses IX as a hypotenusal pharaoh are so bizarre, I feel that I must take a moment to explain them; otherwise, everyone will be frustrated. I must also repeat what the texts that accompany the pictures say. The cryptographic inscription that goes with the hypotenusal pharaoh states "This god [Osiris, or Rameses IX as Osiris] is in this fashion: his arm in the height, his feet in the place of destruction."<sup>6</sup>



Figure 8.11. A photo of the hypotenusal pharaoh in the tomb of King Rameses IX. His erect phallus has been chipped away. The image is now behind glass and impossible to photograph properly. (Photo by Robert Temple)

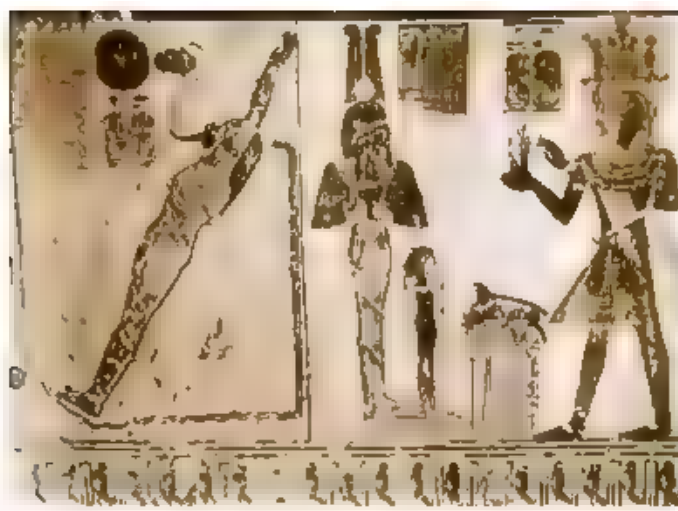


Figure 8.12 A hypotenusal pharaoh, in this instance, Pharaoh Ramesses IX, as portrayed in his tomb in the Valley of the Kings, on the right of the descending passage as you go down (The painting is now behind glass and partially obscured, so adequate photography is no longer possible.) The mummified pharaoh, who has “become a Horus,” forms the hypotenuse (called Horus by the Egyptians, according to Plutarch) of a golden triangle. The golden angle is formed by the vertical and a line that runs from his hand to the back of the pharaoh’s heel. In figure 8.37 is another hypotenusal pharaoh preserved in a papyrus, where the golden angle goes the other way, with no arms outstretched and running from his heel to the center of his head. Since the “pharaoh as a Horus” that is, the pharaoh as a hypotenuse, is purely symbolic, it doesn’t matter whether the golden angle runs down from his head or up from his feet.

It is a standard formula in all these types of inscriptions to begin by saying “This god/these gods is/are in this fashion . . .” Here, because the text from a papyrus has been correctly copied by the scribes, the description is accurate. Even though the golden angle has been put at the wrong end of the figure, the textual description has the feet in the right place and the arms in the right place. By “the place of destruction” is meant the lowest depths of hell where the evil dead are annihilated, also known as the Place of Annihilation. As Darnell has probably been the first person to observe since antiquity, the Place of Annihilation or Place of Destruction was conceived of as being far below the eastern horizon. (This was necessitated by the fact that Re-Osiris had to have his feet there when he was rising.) And as you may be guessing by now, the hypotenusal pharaoh was meant to be identified with the giant Re-Osiris at the eastern horizon as the sun rises. So, although he was often depicted as a giant standing at the horizon with his feet in the depths of hell, doubtless squashing a lot of the evil dead in the process, the rising Re-Osiris was also represented as a hypotenusal Osiris, or, as Darnell likes to call it, an Osiride figure. In fact, Darnell calls the hypotenusal Ramesses IX an Osiride figure, which indeed he is. One way to understand what the scholars are saying is to figure out the terms they use, so one knows what they are referring to. Half the difficulty with scholarly books is that confusing terminology is used, so that ordinary people get lost and cannot follow the argument. As for Egyptological books, they are as incomprehensible to ordinary readers as books on the calculus, due to the fact that they are full of linguistic symbols that spell out the Egyptian words without vowels. These symbols achieve precision and impress fellow scholars, but they exclude readers who are not also Egyptologists, unless they are prepared to learn these symbols. By definition, therefore, Egyptologists are only writing for each other. Since the views of the public do not matter to them, as they are generally interested only in their professional and academic lives, positions, and reputations, they don’t care. Thus it is that the public is rarely kept informed, unless an Egyptologist deigns to write a popular book now and then. I have made a point of never using any of those symbols in this book, and sometimes when quoting I have transcribed them into comprehensible familiar letters for the benefit of the reader.

The entire base of the Enigmatic Wall of Ramesses IX consists of a row of bound enemies kneeling, with their arms tied behind their backs like prisoners taken in battle. These represent the defeated evil



dead, “alluding to the time of the final victory of the sun at the end of the night as the time of the flaming destruction of the damned,” as Darnell colorfully expresses it.<sup>7</sup>

The top row of drawings on the Enigmatic row consists of eight circles. The first four are yellow and the second four are red (this cannot be seen in the black-and-white figure 8.13, and there is no color image of the full Enigmatic Wall). They all contain inverted figures of men with their arms and legs spread wide. Solar or stellar disks rest beneath each, indicating their attributes. Darnell believes that the circles represent sources of light, but although the discs containing the men are made of light, they are not emitting light, thus giving the inverted figures a “clothing effect of light,” for he says: “Light travels around and hides these figures”<sup>8</sup> Darnell says these plummeting beings are falling stars, “lords of the Netherworld” (*nebu Duat*), “stellar Blessed Dead.” (There may also be an implied reference to meteorites, the sacred aspect of which to the Egyptians I discussed at very great length in *The Crystal Sun*. The iron that fell from heaven, often magnetic lodestone, was carefully gathered from the sands of the desert, where it can easily be seen as black stones on the yellow sand, and used for sacred purposes that I have described.) The reason why they are upside down is that everybody who enters the netherworld does so upside down. Part of the struggle in the netherworld is to turn yourself right way up and not remain inverted. The evil dead remain upside down and then have their heads permanently cut off as well. (I say “permanently cut off” because the “justified dead” had their heads handed back to them after their judgment in the netherworld, and the heads were stitched back on for them by Anubis! How many people have dogs like that, who are good with needle and thread?)



Figure 8.13 This is a drawing of the entire Enigmatic Wall found in the tomb of King Rameses IX in the Valley of the Kings, on the right as you descend into the tomb. The hypotenusal pharaoh in the right third of the wall design is the same as seen in figures 8.11 and 8.12. This image of the whole wall comes from an article by Felix Guilman, “La Tombeau de Rameses IX” (“The Tomb of Rameses IX”), in *Mémoires de l’Institut Français d’Archéologie Orientale*, Cairo, Volume 15, 1907, p. 63. It is not necessary to comment here on the iconography and importance of this Enigmatic Wall, as the design of the wall and the significance of its elements are analysed in extensive detail in several pages of the main text, commencing on page 400.

One of the strange features of the Great Pyramid is that the Subterranean Chamber beneath it has a smooth ceiling resembling a floor, but the actual floor itself is rough and bumpy and difficult to walk on without twisting an ankle. If the Subterranean Chamber is taken as representing the netherworld, then of course it would have a smooth ceiling resembling a floor, because the dead are upside down and have to walk on the ceiling.



Figure 8 14. According to ancient Egyptian theology the dead enter the Other World upside down, as mirror images of themselves on earth. They therefore walk on the ceiling. This photo shows the bizarre Subterranean Chamber beneath the Great Pyramid. No one has ever understood why it has a smooth and flat ceiling, meticulously cut out of the bedrock to be level, but a rough and lumpy floor. The reason is presumably because it represented the netherworld, and the dead entered it upside down, walking on the flat ceiling and the floor did not matter. We should always remember that the dead also walk on the ceilings of descending passages in Egyptian pyramids and tombs, and we should be alert to signs and indications above our heads, not below our heads, in such passages. (An example is the "black door" in the ceiling of the Descending Passage of the Great Pyramid, seen in figures 7 12 and 7 13, which, although obscured originally to the human eye by a limestone slab, would not have been invisible to the dead, who can see through matter. A "black door" of basalt was, I believe, often meant to be a secret sign for the dead. Figure 7 15 is a photo of an odd basalt stone in the Valley Temple for instance, which certainly has mysterious significance of some kind and is definitely not accidental.) This photo was taken in 1909 and shows John Edgar in the center of the photo. Crouching above him is his Egyptian assistant, Judah. All the loose rubble we see here has since been removed, but the floor today remains as lumpy and rough as ever. (This photo is Plate LIII on page 148 of John and Morton Edgar's book, *The Great Pyramid Passages and Chambers*, Glasgow, 1910.)

Beneath the plummeting stellar beings is, first of all at far left, the sun god as Khepri in his boat, with one of the Eyes of Re on either side of the beetle. He is sailing through the netherworld, with difficulty, trying to avoid getting grounded on the back of the evil satanic serpent Apep, who is shown writhing in his coils beneath the boat. The cryptographic text says: "In this manner does this god travel in his boat, having navigated upon the back of Apep. As soon as he passes by, they loose their arrows. While casting this fire, those on their mounds leap up to (or 'for') him. Those armed with their arrows burn up the enemies of Re, even when he passes by them."

Just to the right of the solar boat, arrows may be seen making golden angles with standing serpents. Darnell thinks these arrows are being fired at the serpents to kill them, but a closer examination of the picture reveals that except for the first, the feathered ends of the arrows are beside the serpents, and the tips are pointing away from them, with dotted lines showing their trajectories from the tail of one to the head of another. These arrows are meant to represent flaming light rays that "cast fire" and "burn up the enemies of Re," but the exact interpretation of the scene is elusive. In Egyptian mythology, however, it was not necessary to have a bow to fire an arrow. Certain netherworld messengers were reputed to shoot fiery arrows directly from their mouths.<sup>9</sup> To their right are seven slaughtering places where evil serpents, enemies of Re, are destroyed. These are slaughtering places represented as mounds of sand. As the text continues: "In this fashion do they exist: the Nehaher snakes which are slaughtered, he making a pause at their slaughtering pit of sand, 'He who hides the mystery, who praises the members which are in it (the shetau).'"<sup>10</sup>

Sometimes Nehaher serpents are friendly, but in this text, they are enemies of Re, and Apep himself is called Nehaher. The erect serpents in front of the mounds of sand, on which female executioners stand, have arrows of flaming light penetrating their heads and killing them. These executioners, who are not



shown actually firing arrows, are in a posture of adoring the sun while they carry out their job; they are all called *petekhi*, which means “those who lay low the enemy.”<sup>11</sup> Although they appear feminine, Darnell believes they are essentially androgynous. Each mound is called an *iat* mound, and is a *shetat* (mysterious place).<sup>12</sup> (The Shetayet is the portion of the netherworld through which the sun moves at night, and is described as mysterious. The name is related to the Egyptian adjective *sheta*, which means hidden.) Two of the arrows flying at the serpents have actually been fired from the solar boat. Darnell points out that in Egyptian, the verb *seti* has two meanings, casting light and firing arrows, and he gives an example from *The Book of the Dead* where a conscious pun on this double meaning occurs.<sup>13</sup> Therefore the firing of arrows in the drawings, either by the sun or on behalf of the sun, really means the shooting of flaming light rays, and the arrows are symbolic of that.

There is a further inscription about this register of the drawing, which says: “In this fashion are they in the Place of Destruction: This god [*the sun*] calls out to them, that they should be high [*leap up*] for him, they being endowed with their *kheperu* [*beetlelike*] manifestations. When this god goes to rest, his disk is in this cavern, and his birth occurs therein. After this great god passes by these goddesses, they stand up; then the complete darkness covers them.”<sup>14</sup>

In the third horizontal register, below the serpents and arrows, we have at left what appears to be an empty hidden chamber. Ancient temples tended to have such chambers.

To the right of the hidden chamber, there are four standing goddesses enveloped by protective serpents. Their names are given as “Mother,” “she relating to the sarcophagus,” “she relating to the Temem Shrine,” and “Milk.” Each serpent is of a different type, with a different name as well. Farther to the right are four bending figures bearing solar disks on their chests, who are named “The protective one,” “(no name given),” “The naked one,” and “The pleased one.” A text describes this group as follows: “Oh these you four gods who are over these two sides of the sky.”<sup>15</sup> Darnell points out that they are hermaphrodites, because although they have names written in the feminine form (and also long hair), they also have phalluses and are ejaculating. In front of each of these bending figures sits a small child, all having the same name: He of the flame. These children represent youthful forms of the rising sun, according to Darnell. And he describes these figures thus: “Each bending, ejaculating figure with a flaming (?) child before it . . . the name of the solar child . . . [could be translated as] the newborn sun.”<sup>16</sup> He adds, “The child, the flame, and punishment are all in keeping with a representation of [re-creation] and the eastern horizon, where the sun is reborn, and the damned received their ultimate fiery punishment. The androgynous, bending figures both ejaculate and spit, dots of flame issuing from their mouths and pudenda. These spewing effluvia are a pictorial pun on the verbs *nekh* and *nekhekh*, ‘spit’ and ‘ejaculate’ and depict the spitting and ejaculation at creation.”<sup>17</sup> (The creator god, when he created the universe from his seed, did so not only by spewing his seed from his erect phallus by means of masturbation, but also by “spitting.” “Spitting” was an Egyptian punning euphemism for ejaculating.)

Darnell continues his evocative description:

The spittle of the figures pours down to the left of the figures’ heads; in three of the four groups it strikes the ground just to the left of the heads of the scarabs that lie horizontally beneath the bent backs of the figures. In the second group to the left, however, the spittle bends in towards the head of the scarab, an indication that the scarab results from the spittle of the bending figure. In each group the dots of ejaculate flow down to the top of the child’s head, an indication that the child results from the semen of the bending figures. . . . The *kheperu*-form of the sun is spat out, and the *mesut*-form is ejaculated. The fiery effluvia of the entities bring forth the sun, and the ejaculate suggests the

overflow of Nun [the cosmic ocean], in which the sun is born.<sup>18</sup>

Next, beyond the bending figures, we have a bearded figure leaning forward at a golden angle and presumably being a miniature version of the hypotenusal Osiride pharaoh, though this time facing inward rather than outward. He is holding an upright serpent, who is labeled a Nāu serpent. This is a sacred snake, representing the primeval creative forces, who can lead the dead up to heaven by bringing about a repetition of creation, according to Darnell.<sup>19</sup> Emerging from the head or mouth of the Nāu serpent is a Khepri beetle, symbolizing the birth of the sun. Beneath the Nāu serpent is another flaming child representing the rising sun. Darnell believes that the two sets of four entities in this register refer to the four cardinal points and the four winds, which combine to enable Re to sail in a fair wind toward his rising.<sup>20</sup> Darnell makes no comment regarding the two-faced standing entity who comes next and seems to be female on the left and male on the right. Perhaps this figure is meant to suggest the rising and setting of the sun, or just someone who cannot make up his or her mind. The final drawing in this register is a large solar disk preceded and followed by a Khepri beetle, indicating the solar rising. Inside the disk is a woman. Darnell says of this: "The woman within the disk is the eye of Re, here as mother and daughter; the scarabs emerge from the disk-womb on each side."<sup>21</sup>

Then follows the scene of the hypotenusal pharaoh as Osiris, which we have already considered. The next scene is of the pharaoh in his cultic role of solar priest making offerings to the god Ptah and the goddess Maāt (Cosmic Order), who is shown smaller than Ptah because she was a principle rather than a personality; as this was always understood by everyone, large statues of her never existed, and she was always portrayed as a pervasive but quiet and unobvious presence, sometimes symbolized only by a feather. Ptah is described in this scene as "Ptah, lord of right order, king of the Two Lands, Perfect of face, Who created crafts, One presiding over the great place at rest."<sup>22</sup> This makes it clear that Ptah was the enforcer of the principle of Maāt, and that upholding Cosmic Order was his main job. A very fine image of him can be seen in figure 8 15, which is a photo I took of a magnificent gold statue of Ptah seen in profile.

The final portion of the Engimatic Wall is the vertical panel at the far right showing a resurrection serpent rearing up so high that its head escapes the upper border of the wall decoration entirely, indicating that the dead Osiris has indeed risen and burst through the boundaries of the netherworld.



Figure 8.15. A magnificent small statue of the god Ptah in gold, with a lapis lazuli cap. He is holding a *was* scepter, which was a sacred scepter used for measuring the calendar and spatial directions (described at length in *The Crystal Sun*). Ptah was the chief god of Memphis, the Old Kingdom capital near Giza. He was merged with the netherworld god Sokar of Giza, and later also with Osiris, to form a trinity known as Ptah-Sokar-Osiris, perhaps the first three-in-one godhead in history. Ptah, however, was always the senior partner of this trinity and was recognized as one of the candidates for creator of the universe. Thoth, god of wisdom and learning, was his son. Ptah had the reputation for being the all-wise intellectual among the gods. There wasn't anything he didn't know or couldn't figure out if he put his mind to it. During the Fifth and Sixth Dynasties, Ptah was unpopular with the pharaohs, and his name was shockingly excluded from the sacred Pyramid Texts inscribed in the pyramids of Saqqara in that period. This is bizarre, considering that his chief temple was just down the road within walking distance. This hints at some political-religious conflict at the end of the Fourth Dynasty of which we know nothing, due to our lack of historical texts. This statue is in the Egyptian Museum at Cairo. (Photo by Robert Temple)

The Enigmatic Wall contains what appear to be no fewer than six golden angles displayed in its figures, four arrows and two hypotenusal mummies. It has been difficult to measure the smaller ones precisely, but they appear to suggest golden angles, whether or not they are exact. In this, a convention appears to have been followed without the artists necessarily appreciating what they were doing, as is indicated by the large Osiris having his golden angle at the top instead of at the bottom.

I hope it was worthwhile giving a full summary of the Enigmatic Wall, so that everyone can appreciate the mythological milieu we are moving in now. The main feature of importance is the large slanting Osiris, who is merely the giant Re-Osiris shown in his hypotenusal form, which manifests the golden angle of resurrection. If we consider the giant Re-Osiris in more detail, we find that he is depicted and described in texts in numerous places. One of the finest pictures of the giant-in-the-horizon is on the beaten gold Second Shrine from the tomb of Tutankhamun, which we see in figures 8.16 to 8.19. I have put descriptions of those scenes in the captions.

The rising of the sun was viewed as a resurrection, and this had direct relevance to every Egyptian, because it was considered a model for his or her own hope of personal resurrection. As Hemingway would have said, *The Sun Also Rises*, although his title was a quotation from the poet John Donne.





Figure 8.16. This is the giant solar Osiris of the eastern horizon seen in figures 8.17 to 8.19, depicted in beaten gold on the Second Shrine of Tutankhamun. The large encircling serpent swallowing its own tail (called in Greek a *uroboros*) is here called Mehen, which in Egyptian means the Enveloper. The Mehen serpents in general were friendly, protective serpents of the netherworld who wrapped themselves around Osiris and royal mummies to keep them safe. This drawing is taken as a detail from Alexandre Piankoff, *The Shrines of Tut Ankh-Amon*, Pantheon, New York, 1955, figure 41, opposite page 120.



Figure 8.17. The head of the giant solar Osiris of the eastern horizon, the full figure of which may be seen in figure 8.16. The figure is in beaten gold on the Second Shrine of Tutankhamun at the Egyptian Museum in Cairo. (Photo by Robert Temple)



Figure 8.18 This is the middle of the giant solar Osiris of the eastern horizon shown entire in figure 8.16. It is of beaten gold, from the Second Shrine of Tutankhamun. The solar disk fills the belly of the Osiris mummy in the netherworld, and in the center is seen the solar *ba*-bird, representing the spiritual force of the sun, who is about to emerge and be resurrected. The figure to the left is worshipping him as light streams from the solar disk toward him. (Photo by Robert Temple)

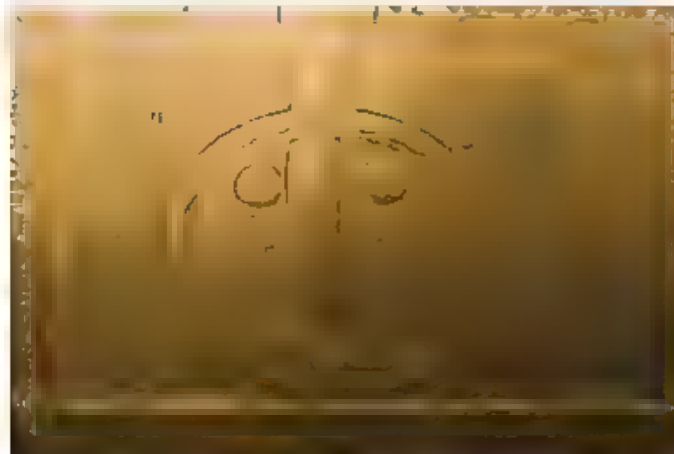


Figure 8.19 This is the bottom of the image of the giant figure of the solar Osiris shown entire in figure 8.16. The image is in beaten gold on the Second Shrine of Tutankhamun. His feet are in herit, the Place of Destruction at the bottom of the netherworld, where the evil dead meet their doom after indescribable agonies. (Photo by Robert Temple)

The way in which the sun rises, especially at Giza, was thought of as *at the golden angle*. The sun as an Osiris came alive, transformed himself into a Horus, and did so as a hypotenuse of a triangle formed by the beams of light as they streamed over the horizon. The surface of the Earth was, quite naturally, the base of the triangle. The Egyptian name of the base of a sacred triangle was, as Plutarch informs us, Isis. The altitude was called Osiris. The hypotenuse was called Horus <sup>23</sup>. Although Plutarch is speaking here of the Pythagorean triangle, it is likely that the same terms were used when speaking of any right-angled triangle that had a religious significance. That Osiris was the vertical altitude of the triangle may be associated also with his upright phallus. It is only natural that the joining or “mating” of Isis and Osiris within the triangle would give birth to a hypotenuse: their son, Horus. In fact, Plutarch specifically calls the hypotenuse “their offspring.”

In the Pythagorean triangle, where the square of the hypotenuse is equal to the squares of the other two sides (and the Egyptians and Greeks really drew squares on them, and did not merely write algebraic symbols as we do; see the Byrne title page, figure 7.26), it was justified then to speak of the hypotenuse (Horus) as the “resultant” or “child” of the other two sides. In the passage of Plutarch where he gives these names, Plutarch uses the Greek word *apotelesma* to describe Horus as a hypotenuse, which means final completion, event, result. In the three translations that exist in English, Griffiths translates it as “the

perfected achievement,” Babbitt translates it as “perfected result,” and King translates it as “the result.”<sup>24</sup> Babbitt and King also call Horus as a hypotenuse the “child” of Isis and Osiris as base and altitude, respectively, and Griffiths uses the expression “offspring.”<sup>25</sup> It was considered that the “powers” (i.e., the squares) of Isis and Osiris when combined gave the “power” (i.e., square) of Horus. This is a remarkable mythological expression of a geometrical fact, but it is typical of the way the Egyptian priests thought. Although the golden triangle is not a Pythagorean triangle—in that the sums of the squares of the base and altitude do not equal the square of the hypotenuse—we may assume that the underlying principle of the Pythagorean triangle was a resonant presence in their minds, like the bass accompaniment in music, and that when they spoke of the hypotenuse of the golden triangle formed at the rising of Osiris as a Horus, they still thought of him as the child of Osiris. But in this case, he was more than just the child, he was the resurrected Osiris himself. This concept is illustrated in a drawing from the tomb of Rameses VI in figure 8.9, showing Horus arising from the body of Osiris at dawn, which was the great transfiguration of the sun and by extension of all the blessed dead. From the mummy of Osiris, the child Horus emerged, and this was the essence of resurrection. This was Horus-in-the-Horizon.

The “word” of the rising sun, expressed as light rays, streamed through the air as Horus, from the horizon, traveling over the path on the ground called Isis (the base of the triangle), and struck the top of the altitude of that triangle on each of the three Giza pyramids, creating three triangles with acute golden angles. Since the tips of the triangles were pyramidions (mini-pyramidal apexes) thought to have been encased in gold, there would have been brilliant solar flashes on these peaks. These flashes would have taken place in a series of three: first the tip of the Great Pyramid would flash, then the slightly lower tip of the Pyramid of Chephren, and finally the lowest of the three, the tip of the Pyramid of Mycerinus. They gave a three-flash sequence to herald the dawn.



Figure 8.20. This is a drawing taken from the wall of the Sarcophagus Hall of the tomb of King Rameses VI in the Valley of the Kings near Luxor. Here we see a very explicit resurrection scene where Horus, “the Son of his Father” rises at dawn as the sun (the solar disk is beside his head to make this clear, and the fact that he is still rising and emerging is shown by the fact that he does not yet stand clear) and becomes Horus-in-the-Horizon. He is emerging from the mummified Osiris, who is in his golden-angled form, though here Osiris is actually shown in a *double* golden-angled form, with both his upper body and his legs being hypotenusal. The women standing to either side are the sisters Isis and Nephthys, who guard the sacred egg that contains the scene taking place at the horizon. The ultimate location for this sacred event was at Giza, precisely at Rostau, in front of the Sphinx, from where the resurrected Horus shone as rays of light (the “speech” or *logos*, of the sun) directly upward at the golden angle to strike the gleaming golden tip of the Pyramid of Chephren and give the dawn flash (see text). The wall text says: “This Great God [Osiris] is like this in his egg which is in the Netherworld. Horus comes out of the body of his father, and praises him who has procreated him while the two goddesses join his body. This Great God [Osiris] speaks to him while he sees the rays of his disk.” (Drawing and translated text taken from Alexandre Piankoff, *The Tomb of Rameses VI*, Bollingen Series 40:1 (New York: Pantheon Books, 1954), figure 116, pp. 364–5)

In New Kingdom times (1570–1070 BC), when the Egyptians could no longer construct pyramids, they continued these practices by using gold-tipped obelisks instead. I have discussed this use of obelisks in great detail in *The Crystal Sun*, where I give illustrations and texts. Solar eyes were sometimes depicted on the tips of pyramids even in the New Kingdom, and this is a reference to the earlier practice at Giza, recorded in old papyri that had survived.



The way the sunrise was observed was that the priests would turn their backs to the eastern horizon and look at the high monument, waiting for the flash, and would then turn and worship the sun in that instant, thus timing their gesture of adoration perfectly, since the sun struck the gold tip first, as it was higher; by the time the priests turned around, the sun would rise at that instant. This was how they achieved their perfect synchronization with the precise moment. To the Egyptians, who were obsessed by ceremonials, this was crucial.



Figure 8 21. A statue covered in gold leaf of a priest wearing a falcon's head to enact the role of Horus. The folded arms beneath the cape are a typical pose of Egyptian priests taking part in ceremonial processions and events, symbolizing secrecy and showing reverence. Such attire may well have been worn by a chief priest observing the sunrise at the time of the equinox at Giza, when Horus-in-the-Horizon appeared. At the moment itself, the priest would have removed his arms from his clothing and held up both hands in a gesture of greeting and prayer. However, as described in the main text, I believe that the priests and celebrants had their backs to the sun just before sunrise, observing the predawn flashes on the east faces of the pyramids (obelisk tips, cased in gold alloy, replaced these in the New Kingdom period), and then turned just in time to see the actual rebirth of the sun, at which point they would have raised their hands in adoration. This statue is in the Egyptian Museum in Cairo. (Photo by Robert Temple)

I believe the aerial golden angle that I discovered with the inclinometer from the floor of the Sphinx temple (the horizon) to the tip of the Pyramid of Chephren is a confirmation of this system.

The priests would turn to watch the transformation and resurrection of Osiris, as Horus sprang from the horizon in the form of a stream of light in the sky. To celebrate Cosmic Order, the Pyramid of Chephren was constructed so that it could receive this light at the golden angle, since that was the angle at which "Horus" struck its tip at each equinox. I have not studied the aerial angles of sunrise for the other pyramids or any of the obelisks, and one would have to research the locations from which one would measure the angles. But in the case of the Pyramid of Chephren, it is the Sphinx that determines the angle I found, since the angle is taken from the floor of the Sphinx's Temple. The Sphinx can thus be conceived of as facilitating the golden angle of resurrection by its placement and acting as a conduit for the resurrection by light.

That the light of the sun was conceived of by the Egyptians as the sun speaking, or as his “word,” seems to have carried over into the earliest level of Christianity. I show in figure 8.22 one of the strangest early Christian graffito designs. This illustration is taken from a book by the same C. W. King who translated the Plutarch treatise for Bohn’s Classical Library that I quoted above as a variant when I gave Plutarch’s information about the name for a hypotenuse among the Egyptians. This astounding drawing appears opposite page 90 in King’s book *The Gnostics and Their Remains* (1864) <sup>26</sup> The illustration is described by King as “Anubis-Christos.” It is the earliest-known depiction of the crucifixion, dating from the late second century AD. It is generally called the Palatine Graffito. <sup>27</sup> It was found drawn on a wall of the Imperial Palace on the Palatine Hill at Rome. There are two accounts of the room where it was found: the first says it was inscribed in a private vaulted cell by a slave who lived there and served one of the early Caesars, and the second says it was inscribed in “a schoolroom,” which may actually have been an informal chapel. The name of the man who drew it appears to have been Alexamenos, and he shows himself standing beside the crucified deity with his hand raised in adoration. He appears to be wearing nothing but the short linen garment of someone who has just been baptized or initiated. The inscription in Greek says: “Alexamenos worships the God.” King was an expert at analysis of these drawings and stresses that the poorly drawn head definitely represents Anubis and is a jackal head. In other words, the earliest-known drawing of the crucifixion of Christ portrays Christ as Anubis. As time went on, with the many drawings of Anubis that continued to appear on Gnostic gems throughout Roman times, people who had never seen a jackal got the head progressively wrong, and it looked more and more like an ass’s or donkey’s head. This drawing showing Christ crucified as Anubis suggests a mystic tradition going back directly to the original Giza tradition via the Ptolemaic Netherworld Texts and illustrations, which were themselves drawn from ancient papyri (no longer fully comprehended) dating from the time when the Sphinx was still Anubis, who welcomed the “word” of the sun (*logos*, later meaning “word” in Greek) at his rising. We know that *Logos* was St. John’s name for Christ. Just to make the connection with the golden angle more obvious, *logos* also means ratio in Greek, as we have seen. In other words, the “mystery of the cross” is a mystery that goes back to the origins of Egyptian civilization, and Jeschu the Nazarene (better known by the Latin form of his name, Jesus), who spent time in Egypt before his return at the age of thirty to Galilee and Judaea (the original home of his family having been in Galilee at the fishing village of Nahum, known in Latin as Capernaum, which he left as an infant, having been born at Bethlehem in a stable, as the Bible informs us), must undoubtedly, in my opinion, have been deeply learned in Egyptian lore and embodied it in his esoteric teachings. Jesus made himself an actor in a sacred mystery drama, which he lived out in person to enact certain cosmic truths. I believe that some of this drama was directly inspired by Egyptian esotericism that he learned when living at Leontopolis, where there was a Jewish temple larger than that at Jerusalem and where very friendly relations with Egyptian priests and initiates were possible for Jews, because there were no Sadducee fanatics to prevent this happening. The Jews of Egypt were open to many influences, Greek, Egyptian, and Near Eastern, and were not narrow-minded bigots like those to be found in the backwaters of Judaea and Galilee, where intolerance was a mania. The name Jesus of Nazareth is incorrect, because the village of Nazareth did not exist at the time of Jesus. It was founded only about four hundred years later. The historical Jesus was not Jesus of Nazareth at all, but Jesus the Nazarene, describing his affiliation or generic similarity to the vegetarian sect of the Nazarenes, who were opposed to the Sadducees and held to a mystical form of Judaism, rejecting total subservience to the Law of the harsh rabbinical form of the politicians of Jerusalem. When the Roman Church gained control of Christianity with the power of the Roman state behind it, executing all the people whom they called heretics (i.e., opponents) and burning the large number of gospels they didn’t like (such as the Gospel of Thomas and the Gospel of Philip, which were



recovered at Nag Hammadi in 1947), they altered the texts in the four gospels they chose to retain so as to eradicate the word *Nazarene* (a sect opposed to them, who took their name from *nazara*, “the truth” in Aramaic, although “the truth” in Hebrew is generally called by the name of *emet*), substituting *of Nazareth* for *the Nazarene* and claiming they were correcting a scribal error. That is how the phrase “Jesus of Nazareth” got into the surviving gospels: it was interpolated by censors. They could not strike out “Nazarene” completely, because it was too well known, so they circulated the story that “Nazarene” really meant “man from Nazareth,” which it does not, and which in any case was impossible because there was not yet any Nazareth for Jesus to have come from.

But what is the meaning of the crucifixion? This is the remaining piece of the puzzle. The fact is that the crossbar of the cross represents the major of the upright of the cross divided in golden section, and by combining them (whether intersecting or as a top bar does not matter), one was portraying the golden section by a symbol, the cross. Early drawings of crosses often had footbars as well, as this one does, and that was the minor. So the footbar is the minor, the crossbar is the major, and the upright is the sum of the two together. The minor and the major are in a ratio (*logos*). Crucified on the cross is the Logos himself, Christ. And for a sacred figure to be crucified means for that figure to be “nailed to the cross,” that is, *fixed in correct proportion with the cosmos by means of the divine proportion and sacred ratio, the golden section*. By this means, the sacred figure of a god is “nailed to Maāt” and exemplifies Cosmic Order. Just as Osiris was resurrected as Horus, “the Son of the Father,” so too Christ is resurrected as “the Son of his Father,” but first both must be crucified, must appear aloft in golden section. *The Logos must be crucified to give the promise of eternal life by his resurrection*. On the basis of such insights, one might create an esoteric and purified Christianity, if people could free themselves from fanatical literalism, which is doubtless expecting too much.



Figure 8.22 The oldest surviving depiction of the crucifixion shows Christ crucified as Anubis, with a jackal head. This drawing is known as the Palatine Graffito (From C. W. King, *The Gnostics and Their Remains*, Bell and Daldy, London, 1864, plate opposite p. 90)

The earliest Christians, presumably the Gnostic ones, wished to make it clear that the symbolism of the crucifixion had its origins in Egypt, in the presence of Anubis. Thus I believe that the distant memory of the Sphinx as Anubis was passed on without people even knowing its significance any more, but due to the conservatism of religious traditions, this lore continued, thousands of years after it had been possible to give it a rational explanation.

It is interesting that the Christian Gnostics were not “people of the Book.” There are known to have

been more than two hundred gospels freely circulating among the early Christians in those formative days, and it was only after the Roman emperors created a Roman Church that all were burned but four, which were declared canonical by a council of clergy presided over by the emperor, acting as an instrument of state. (The Roman Catholic Church has that name because it was created as an organ of the Roman state. The reason it is so political is that it was created to be political by someone who ruled an empire ) The Gnostics, who were persecuted and burned at the stake by the Catholics, did not want to go around killing people because they held variant opinions. Thus, we may view the intolerant form of Christianity as a perversion created by a Roman emperor, just as the intolerant form of Islam known as Wahhabism or Salafism, which only originated in the eighteenth century, was a perversion adopted and propagated by Saudi kings. In both cases, the original purposes were political. (In the case of the Saudis, they were trying to bolster their legitimacy, because they had seized the “sacred” cities of Mecca and Medina by military force in the 1920s from the Hashemites, who had been the guardians and custodians of those cities for a thousand years. To prove they were worthy in religious terms, they adopted an extreme and insane form of Islam to appear to be more pious than any other Muslims in history, as a means of compensation and as a public relations exercise Unfortunately, this innovative form of Islam has now, due to propaganda funded by oil money, come to be seen as somehow ancient and authentic, which is one of the greatest lies in history.)

It should be mentioned also that the Jews have never been known to want to convert people, and they try very hard to discourage conversion to Judaism, as friends of mine tell me who have married Jews and attempted to convert. In this respect, they somewhat resemble the first Christians, the Gnostics, who, although wishing to spread the “good news” (*evangelium*, “gospel”), were not going out and beating people over the head or threatening to slit their throats with scimitars to make them accept the “good news.” However, whenever religions become aligned with states, persecution commences, and this has happened in Judaism as well. During the time of Jesus the Nazarene, the ruling establishment Jews of Jerusalem were known as the Sadducees. During Jesus’s lifetime, the Sadducees are estimated to have executed no less than six thousand Pharisee rabbis who held a different view of Judaism from themselves (but not the same as that of Jesus, whose view was different again), in a ruthless political attempt to seize total control of Judaism and create a state form of the religion based in Jerusalem in which no variation of doctrine would be allowed upon pain of death. However, in Egypt at that time, there were an estimated one million Jews, living at three centers Alexandria, Leontopolis, and Elephantine Island. Because these Egyptian Jews, who vastly outnumbered the Palestinian Jews, were not caught up in the Sadducean politics of Jerusalem, the Gnostics were stronger in Egypt, and the absorption of Egyptian religious symbols and concepts was greatly facilitated It is from this background that the crucified Anubis at Rome comes.

In *The Crystal Sun*, I published a color photo (as plate 22) of the sun as represented on the famous astronomical ceiling of the Temple of Denderah. The rays of the sun in that photo are shown as streams of little triangles, as if the sun was spitting triangles, and it makes clear that solar rays were conceived of as specifically triangular phenomena. As I pointed out in that book also, we are told explicitly by the Roman author Pliny that the Egyptians considered their triangular obelisks to be “petrified descending light rays,” in which light had been frozen in stone But I cannot repeat my lengthy account of the optical aspects of obelisks here, as that has already been done in my earlier book, in the context of my discussion of the ancient history of light technology and the use by the ancient Egyptians of crystal lenses, of which I found many examples languishing unappreciated in museums. (I was able to demonstrate that the technology for optical surveying existed in the Fourth Dynasty and prove that optical magnification was used by Egyptian craftsmen for microscopically carving ivory as early as predynastic times, circa 3300 BC )

According to the French Egyptologist Alexandre Moret, as early as the Pyramid Texts of the Fifth Dynasty, there was a Ray god named Iahu, “of which the word-sign shows precisely the sun projecting its luminous triangle, divided by a bisector which gives to that triangle a ‘pyramidal’ appearance” Moret then mentions “the numerous examples where, above all in the paintings of the sarcophagi, the solar disc is depicted projecting some rays which are composed of little triangles packed one on top of the other, from which we have the word sign.” He adds that a triangle also figures in the name of Sepedu, god of the Eastern Horizon.<sup>28</sup>

There is a great body of lore of triangles embedded in Egyptian texts and sacred illustrations that has never been investigated properly, because Egyptologists are not geometers or mathematicians, and also they have not been looking for these things. Above all, the importance of the golden angle and its resultant golden triangle has not been appreciated. Now that we have seen that the Giza Plateau and its main monuments are all interrelated geodetically by multiple interlocking golden angles, all the triangle lore that has always infused the most esoteric aspects of Egyptian religion and design science can be seen to be one of their deepest secrets. We can now appreciate the amazing profundity that geometry had for them. The knowledge of geometry was to them like nuclear science and quantum theory are to us, a way of getting at the heart of matter by elucidating the concealed structures that govern the Cosmic Order. Egyptian religion was, in essence, a sacred science. But what is most surprising of all is that their sacred science was not built on mere superstition and fancy; its fundamentals *are all true*.

What was true in the Age of the Pyramids is true now: golden angles are real, not imagined, the golden section is a universal phenomenon true on all worlds at all times throughout the universe. This is genuine cosmic structure, and it elucidates real Cosmic Order. The number 1.618, which defines the golden section and is called by us *phi*, exists in the most distant galaxies. It is true everywhere, just as *pi* is true everywhere. These are facts from which one cannot “move on.” With our mania for the new, we cannot escape the old. The rules of fashion do not apply in geometry. Some things are eternal.

Can it be that the Egyptian civilization lasted for 3,500 years because politicians were not allowed to “move on,” and because there was no “media class”?

I mentioned the Temple of Denderah, which contains the most famous and bizarre of all known crypts of ancient Egypt. It is a mystifying and sacred place, which stays with you once you have entered it. Most people we know who have been there have never been able to get it out of their minds and say they keep thinking about it and often even dreaming about it. This is a crypt that celebrates the golden angle as applied to resurrection. The crypt has been discussed by innumerable “alternative authors,” though Egyptologists themselves rarely mention it, because they don’t know what to say, it is so weird. Some authors have claimed that the strange objects held by figures in the wall carvings represent ancient lightbulbs or other fantastic machines of even more advanced technology, such as ray guns. When Olivia and I first saw these reliefs, we called them “snake aubergines” (aubergines are what Americans call eggplants). They really do look like aubergines, and for gardeners and gastronomes like ourselves, that is what they suggested, rather than lightbulbs. However, they do also look rather like huge aubergine-shaped neon lightbulbs. So what are they? They are shown in figures 8.23 to 8.35. It is worth studying these rather closely, because they relate to our subject, and also because they have become a matter of such sensational interest to readers around the world.

This crypt is in a temple that has many crypts, but this is the only one with these mystifying and puzzling designs (or at least the only one so far discovered, as I suspect there are other crypts at a lower level, and even more at the same level; both of which I believe I have discovered evidence of by detecting either unopened hollow spaces or potentially or formerly movable stones). However, I have



never made a proper study of the Temple of Denderah as I have of the Temple of Seti I at Abydos, where I did officially sanctioned work, and of which I have written a comprehensive survey of previous publications, together with a full analysis of published data, and the results of a full and intensive structural investigation and dating study, which awaits publication at some appropriate opportunity and reveals surprising discoveries.

The narrow Denderah crypt with the “snake aubergines” is technically known as Chamber C of South Crypt Number One. The wall carvings and textual inscriptions were first published in 1947 by the great French scholar Émile Chassinat in his massive series of volumes *Le Temple de Dendara*, published in Cairo by the French Institute. The texts and carvings appeared in volume 5, which itself was a double volume. For many years it was impossible to obtain these books, and they could be consulted only in a few specialist libraries. But in 2002, the French Institute reprinted them, and they became freely available to individuals again. Although of course the books are in French, both the hieroglyphic texts (which are not translated) and photographs speak for themselves, the former to Egyptologists of any language and the latter to everybody. As for the texts, they have fairly recently been translated from Egyptian hieroglyphics into both French<sup>29</sup> and German.<sup>30</sup> I can read the German version myself, and for the French version, I am grateful to the young Egyptologist Tessa Dickinson, who is bilingual, for translating the relevant passages into English. I shall be quoting from her translation, with a few amendments made by myself. These texts explicitly state what the images are meant to represent.

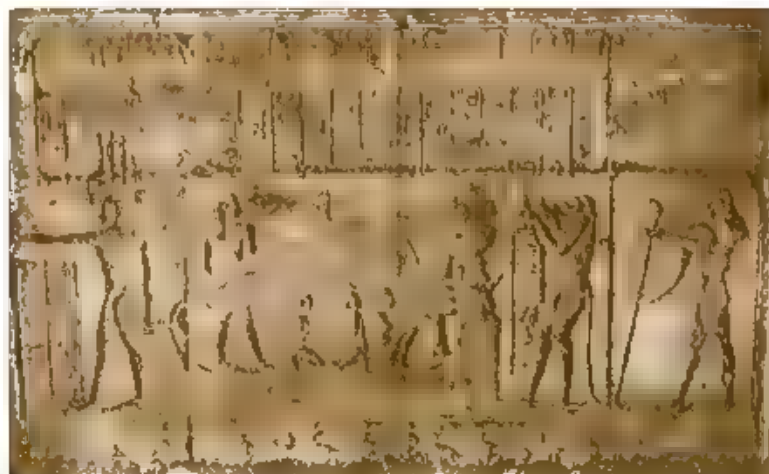


Figure 8.23. A plate from Chassinat's *Le Temple de Dendara*, volume V, showing the right half of the north wall of the underground “serpent cell” crypt. There is only one serpent cell on this wall, and the netherworld's avenging angel, Uputi, stands before it with his raised knives. Normally he cuts off the heads of the evil dead, but here he stands guard. He wears a monkey skin and has the head of a frog. Because the monkey skin is clearly depicted (see close-up photo in figure 8.33) being worn as a costume, this scene may represent a ritual carried out in the temple, even in this very crypt. If so, the scent of the blue lotus must somehow have been available. The chamber might have been filled with the blossoms at the proper season, or otherwise some method of capturing the scent and the alkaloids in concentrated form may have been used. Since the Egyptians do not appear to have practiced distillation, this may have been done by a process resembling enfleurage or maceration, which are still used at Grasse by the French perfume industry as the only means of capturing the delicate essences of flowers such as violets (the scent of violets does not survive distillation in the way that the more robust attar of roses does, and can never be obtained by that method). The absorption of the active principles of the flowers by a purified fat preserves them indefinitely, provided a natural preservative such as gum benzoin is used to “benzoate it” and prevent it becoming rancid. This fat could then have been burned on a brazier, releasing powerful waves of the scent to provide a deeply scented atmosphere in a closed crypt like this one, into which only a few people can fit. It is possible that the concentrated essence of the blue lotus may have some remarkable property discovered empirically by the ancient Egyptians and unknown to us.

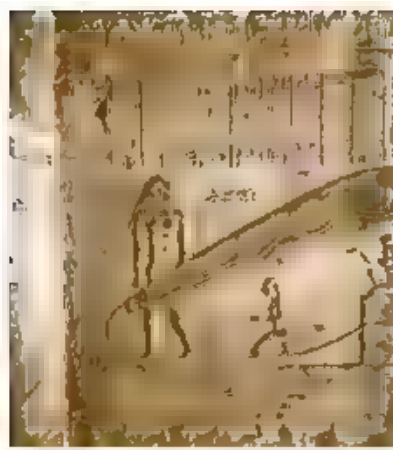


Figure 8.24. A plate from Chassinat's *Le Temple de Dendara*, volume V, showing the left portion of the south wall of the crypt, with one of the two serpent cells issuing from a blue lotus, beneath which crouches a worshipper in prayer. On a plinth at right, one of the sons of Hathor (Ihy or Harsomtus), with a solar disk on his head, supports the serpent cell, with his arms raised in the *ka* position. The serpent representing Resurrection is coming out of the blue lotus, the sacred flower that exhales the scent of immortality. A line drawn from the point where the son of Hathor's left hand supports the end of the serpent cell to the end of the top of the baseline of the central panel at the exact corner of the chamber forms a golden angle with the top of the baseline. The serpent cell and its serpent of Resurrection are thus generated by a golden angle.



Figure 8.25. The drawing from Chassinat's *Le Temple de Dendara*, volume V, showing the north wall of the "serpent cell" crypt. The solemn figure of the underworld god Sokar sits on a plinth slightly to the left of center, presiding over the scene. My close-up photo of this image is seen in figure 7.6, where the hieroglyphic name Sokar is clearly visible beside his head. To the right is the north wall's sole serpent cell, facing which is the netherworld's avenging angel Upu with his knives (see figure 8.33 for a close-up view of him). Here he is protective, but his normal role is to cut off the heads of the evil dead. (In the German translation of the texts, he is called merely Upu, which was a shorter form of his name.) The enthroned figure at left is the goddess Hathor, with her characteristic headdress. She is receiving an offering from one of her sons, either the younger son, Ihy, or the older one, Harsomtus. Behind her, at a much smaller scale, a man in a netherworld boat, possibly representing the pharaoh, is sailing, holding a staff topped with a blue lotus flower, from which a Nehep serpent symbolizing resurrection is leaping. The figure presenting an offering to Hathor from behind the statue of Sokar is shown as a child of Hathor by his side locks, and is either her older son, Harsomtus, or the pharaoh portrayed as honorary son.



Figure 8.26. The drawing from Chassinat's book *Le Temple de Dendara*, volume V, showing the south wall of the "serpent cell" crypt. Here there are two serpent cells facing one another at left. The enthroned goddess seated at right is Hathor, in her characteristic headdress, and holding a was scepter. An offering is being made to her by one of her two sons, probably the younger one, Ihy, who holds an ankh, symbol of life, in his left hand. The figure making an offering behind the figure of Sokar is probably Hathor's older son, Harsomtut, wearing the joint crowns of Upper and Lower Egypt. Both sons are shown with the side lock, indicating their status as children of the goddess. (It is possible that the "son" with the crown is meant to be the pharaoh, granted honorary sonship in this instance.) The Sokar figure and the Nehep serpent symbolizing resurrection are seen in close-up in figure 8.27.

The reliefs in the crypt show three "snake aubergines" in total, one on the north wall and two on the south wall opposite. What is important about these "snake aubergines" from our point of view is that they are drawn at golden angles to the horizontal. We suspect there must be something strange going on, and there is.

I have given a lot of information about the images in the captions to the photos and drawings, so here I will give a summary account, omitting many of the details of the images, which I leave for the captions, where they may more appropriately be read at the same time as studying the pictures.

I was unable to get far enough back in the narrow crypt to obtain flat images of large sections of wall. These are, however, available in black-and-white photos from the 1940s, lit by professional equipment and exposed by time exposures on tripods, in the Chassinat volume. So my color images taken with a flash need to be supplemented by the Chassinat black-and-white images, which I have reproduced here for comparison. I have also reproduced Chassinat's drawings of the wall designs so that the entire walls can be seen in their total contexts. Otherwise, impressions might be misleading. Mistakes are often made in Egyptology by failing to consider whole contexts of strange phenomena, the main example of that is the Giza Plateau, where the Great Pyramid and the Sphinx have usually been studied in isolation rather than as part of a complex including the other two pyramids as a unified conception (but as we have seen, only by considering them as a whole was it possible for me to discover the Giza Golden Plan).

If we start first with my figure 8.27 below, we can see the netherworld falcon Sokar, and immediately before him is a snake sailing in a netherworld boat, standing on its tail. This is one of the Nehep serpents that we have already encountered and that symbolizes resurrection. We can see that we are in familiar netherworld territory.

In figures 8.25 and 8.26 from Chassinat's book, we can see the entire south wall and the entire north wall represented in drawings. It is impossible for anyone to photograph them in their entirety, as the crypt is too narrow to allow that. In figure 8.26, we can see that the Sokar and Nehep figures that we see in figure 8.27 are in the center of the wall. The left portion of that wall is taken up with two bizarre "snake aubergines." These strange shapes are really "serpent cells," and we shall call them that from now on. If we look at figure 8.28, which is my close-up photo of the right serpent cell, we can see that it issues as an emanation from an upward-curving lotus flower, which is, in fact, the famous blue lotus of the ancient Egyptians, a rare plant that is now verging on extinction and has a flower of a subdued and somewhat pale mauve-blue color. It is a mysterious plant, and its flower is delicate and eerily beautiful. Although it has a lovely fragrance, that fragrance is very faint, so you really have to smell hard to detect anything other than a vaguely pleasant smell of a singular delicacy. It does not appear to possess any obvious narcotic properties. I wonder if there may have been a variety of blue lotus in ancient times with a more powerful and obvious odor. This is the magical flower that was always being held to the noses of the pharaohs and the gods in sacred art, since its scent represented the breathing in of an essence that could stimulate and provide immortality. Prows of sacred ships, especially netherworld boats, often consisted of these curling lotus stems issuing forth in flowers that bent backward. Superficially, the wall relief shows a man who

appears to be carrying the serpent cell, but this close-up view demonstrates that he is not even touching it, and his hand is rigidly and vertically down in the reverential position of a sacred procession. The serpent cell is thus entirely independent of him; he is a mere attendant. A long, thin serpent is issuing out of the blue lotus, inside the serpent cell. Olivia has always thought that the blue lotus contains a so-far-unidentified magic ingredient, possibly an elusive or volatile alkaloid, and maybe even in its stem or bulb.



Figure 8.27 At left is the netherworld god Sokar in his falcon form (from the solar disk on his head, two large plumes arise, which are not visible in this photo). To his right is the Nehep serpent standing upright on its tail and sailing in a netherworld boat. It represents resurrection (*Nehep* comes from the Egyptian verb meaning to leap up). This scene is on the south wall of the crypt. (Photo by Robert Temple)



Figure 8.28 This is the right serpent cell of the south wall of Chamber C in the Denderah crypts. This close-up photo shows how the cell and the serpent are issuing forth from a lotus flower (in fact, it is the sacred blue lotus of the lotus god Nefertem, which was frequently held to the nose by royal and sacred figures to indicate the breathing in of the essence of immortality). I did not notice this fact, because I persisted in the amusing notion that the serpent cell looked so much like a huge aubergine (eggplant) that I could not get any other image of it into my head. It was Olivia who pointed out to me that this was a lotus flower from which the cell and the serpent were emanating. She is far more visual than I am. It is also the case that the standing figure behind the cell is neither carrying nor supporting the serpent cell, as his hand may be seen not to be touching anything. Instead, this serpent cell is being supported entirely by the Djed pillar with arms, which is shown in figure 8.30. (Photo by Robert Temple)

Figure 8.29 is a close-up of the left serpent cell of the south wall. Here again we see the serpent cell and its interior serpent clearly issuing from the blue lotus flower. In figure 8.30, we can see a close-up of the front end of the right serpent cell of the south wall. A worshipper kneels beneath the serpent cell in a posture of prayer. The serpent cell itself is supported by what is called a Djed pillar, with upraised arms



in the position of a *ka* (a kind of soul, the “double” of the deceased person) emanating from the sides of the Djed; this picture of a *ka* may be part of an unrecognized cryptographic inscription, or it may be purely iconographical. Another *ka* emanating from the top of a Djed this time supports the single serpent cell on the north wall, as seen in figure 8.32. Here the *ka* arms penetrate the serpent cell and directly support the serpent within. The Temple of Denderah is sacred to the goddess Hathor, and she may be intended to be the goddess seated in the boat, supporting the serpent cell with her head. (Since her pose is that of a hieroglyph, as are the *ka* and the Djed, a cryptographic statement may be intended here.) This Djed sits on the prow of this particular netherworld boat, whose stern curves around and becomes another blue lotus blossom from which emanates the serpent cell of the north wall, as seen in figure 8.25. In the former photo, figure 8.31, to the right of the Djed a male child crouches on a plinth, with a solar disk above his head and his arms upraised in *ka* position to support the far end of the serpent cell. This is one of the two sons of Hathor, either Ihy or Harsomtut. He is shown with the side lock of hair that indicates he has not yet come of age and emphasizes his status as child of the goddess. The serpent, whose head is shown so clearly here, represents the resurrected and emerging life of the risen sun, which has been breathed out by the sacred lotus flower.

The netherworld aspects of these strange pictures are highlighted by the presence on the north wall of the terrifying Uputi, a messenger demon of Osiris and an avenging angel, whose main job was to hunt down the evil dead, like a relentless detective, and chop off their heads as soon as he found them. On the north wall he stands with knives held up in each hand, ready for action, but in protective mode. We can see Uputi in figure 8.33. He wears a monkey skin and has the head of a frog. Uputi’s monkey skin is so obviously a costume that we may have a depiction of a priestly ritual here, rather than of the netherworld itself. He is standing guard over the north wall’s only serpent cell



Figure 8.29 This is the left serpent cell of the south wall of Chamber C. Once again the attendant is not carrying it or touching it. In this case the lotus flower from which the cell and serpent are emanating curves around, and its stem (to the right of the photo, not visible here) turns into the prow of a nocturnal solar boat. The knees and hands of a praying figure may just be seen at bottom right. (Photo by Robert Temple)





Figure 8.30. The Djed pillar, here quaintly portrayed as animate and raising its arms supportively was sometimes described as the backbone of the god Osiris. It was meant to symbolize stability and correct orientation. It may have had a connection with surveying and the use of angles, concerning which see my discussion of this subject in *The Crystal Sun*. The raised arms also are a hieroglyphic sign for *ka*, which is one of the various types of soul, often called a person's double or the animating principle of a being that survives death. In *The Crystal Sun* I point out that the raised arms may also have been a feature of surveying, when the correct orientation to the cardinal points was being sought for a sacred building and a sighting was being taken, with the person being looked at through the proto-theodolite (using the ancient lenses I have discovered and described) holding up his arms, and something resembling the Djed being a graduated measuring instrument for sighting. It is possible that the textual inscriptions in this crypt contain some supplementary or variant statements using cryptographic writing, in which case the raised arms may actually be read as *ka* and form part of an unrecognized textual statement. I do not believe that anyone has ever considered the inscriptions in this crypt from the point of view of hieroglyphic cryptography. It is not impossible that there may be two separate translations of some of the hieroglyphs in this crypt, the obvious reading and the concealed reading. (Photo by Robert Temple) Figure 8.31. On the right, the god Ihy, son of Hathor, crouching on a rectangular plinth (which, if taken as having its base at the level of the adjoining base on which the goddess sits, is a golden rectangle) and with a solar disk on his head, holds aloft the serpent cell of the emerging life of the rising sun. In the center, support is also given by the Djed pillar (often known as the spine of Osiris) with upraised arms in the form of the symbol for the *ka*, so the cryptographic meaning is probably "the *ka* of Osiris." At left, a goddess sits supporting the serpent cell with her head, she is probably Hathor. She and the *ka* of Osiris are riding in a nocturnal boat, with the Djed at its prow; this boat is made of the stem of the sacred blue lotus of Nefertem. The actual serpent representing the resurrected and emerging life of the risen sun, which has been breathed out by the sacred lotus flower, is directly supported by the raised arms of the *ka* of Osiris, and not merely by its cell. (Photo by Robert Temple)



Figure 8.31. On the right, the god Ihy, son of Hathor, crouching on a rectangular plinth (which, if taken as having its base at the

level of the adjoining base on which the goddess sits, is a golden rectangle) and with a solar disk on his head, holds aloft the serpent cell of the emerging life of the rising sun. In the center, support is also given by the Djed pillar (often known as the spine of Osiris) with upraised arms in the form of the symbol for the ka, so the cryptographic meaning is probably "the ka of Osiris." At left, a goddess sits supporting the serpent cell with her head, she is probably Hathor. She and the ka of Osiris are riding in a nocturnal boat, with the Djed at its prow, this boat is made of the stem of the sacred blue lotus of Nefertem. The actual serpent representing the resurrected and emerging life of the risen sun, which has been breathed out by the sacred lotus flower, is directly supported by the raised arms of the ka of Osiris, and not merely by its cell. (Photo by Robert Temple)



Figure 8.32 The serpent cell of the north wall, issuing from a blue lotus flower that curves out of the keel of the netherworld boat, upon the prow of which sits a Djed pillar that supports the serpent with the serpent cell by means of two upraised ka arms. Two worshippers sit beneath the serpent cell facing one another, supporting the serpent cell with their heads, as does the goddess beyond them to the right, who is presumed to be Hathor. (Photo by Robert Temple)



Figure 8.33 The central standing figure is Uputi, a netherworld personality with the body of a monkey and the head of a frog. The Uputi demons were the avenging angels of the Egyptians. They were completely harmless to good people who died, but as they had a violent hatred of evil, they relentlessly sought out the evil dead, decapitated them with their sharp knives, and turned their bodies upside down. It was the fate of all evil Egyptians after death to live upside down and decapitated in pits where snakes and vermin crawled all over them and eternally ate away at their heads and bodies, while they suffered a variety of other untold tortures too terrifying to enumerate. The only extended account of the Uputi demons is in J. Zandee's *Death as an Enemy*, Brill, Leiden, 1960, pp. 202–3. The word *uputi* means messenger, and technically these Uputi demons were the messengers of Osiris and were assistant judges of the dead. Sometimes a Uputi demon would appear to someone about to die as an angel of death. As one spell in the *Book of the Dead* says, "When your messenger comes to fetch you, he finds you prepared. Do not say 'I am too young for being taken away.'" And in a Coffin Text spell, the deceased is advised to say "Oh savage ones of face, messengers of Osiris, who close the mouths of the spirits over what is in them. You have no power over the closing of this mouth of mine. You do not take away the going of these feet of mine." (Photo by Robert Temple)

Now we come to the true significance of this crypt in terms of what we have been considering about the rising sun at Giza, where the golden angle was discovered to be the angle of resurrection. Here, too, the golden angle is found in a resurrection context. On the south wall, if you draw a straight line connecting the tip of the right serpent head to the upper tip of the lotus flower and then continue it on to the baseline of the central panel, it forms a golden angle with the horizontal, so that the serpent of resurrection is seen to be generated by a golden angle. This is shown in figure 8.34 and can be measured accurately by anyone on top of the drawing in figure 8.26. Similarly, the left serpent cell is generated by a golden angle with the horizontal, which can be measured by a line drawn from the point at the very end of the top of the baseline of the panel at the far left (which is also the corner of the chamber, a fact not made clear in the drawing but seen clearly in figure 8.35), to the precise point where the son of Hathor is supporting the serpent cell with his left hand. This can also be measured very precisely in figure 8.26, because it is a drawing that has been done flat-on. The son of Hathor is in this case literally “upholding the golden angle.” Both serpent cells and their serpents on the south wall are thus generated by golden angles.



Figure 8.34 This is the south wall of Chamber C. The serpent cell on the right is being supported by a Djed pillar with arms and a worshipper is praying beneath it. At far right in the photo is the rear portion of the large south wall's Sokar falcon on a pedestal. As with the opposite wall, a line drawn from the edge of the base of the Sokar pedestal forms a golden angle with one of the serpent heads. In this case, the line touches the tip of the left serpent head. (On the opposite wall, there is only one serpent cell, and the line from the edge of the base of the north wall's Sokar falcon touches the tip of the head of that one's serpent.) The figure in this photo standing between the right serpent cell and Sokar is the pharaoh. The serpent cell on the left is supported by the god Ihy, who is crowned with a solar disk, sits on a pedestal, and has the side locks of hair signifying a youth. Ihy was the son of the goddess Hathor, whose temple this is at Denderah. (Photo by Robert Temple)



Figure 8.35. This photo of the south wall of the crypt shows the two serpent cells pointing toward one another, with kneeling



worshippers beneath them, the right one supported by the Djed pillar with arms and the left one supported by one of the sons of Hathor (either the god Ihy or the god Harsomtus) on a pedestal. Both serpent cells and their serpents emanate from blue lotus blossoms, as the breath of resurrection. The two golden angles that generate the two serpent cells are described in the main text and can be measured on figure 8.26. The prow of the nocturnal solar boat beneath the left serpent cell is shown here: it touches the pedestal on which Ihy or Harsomtus crouches (where his left hand supports the end of the serpent cell is a point defining the golden angle with the base). The mortar in the stone wall seems to suggest that there are two small stone blocks beneath the heads of the two serpent cells which at one time were removable. I am not aware that anyone has ever noticed this or thought of investigating whether they might be removable or lead to something. Perhaps the original excavation records mention something about them. However, in terms of normal construction procedures, it makes no sense at all for these two small blocks to be inserted into the middle of a wall carving, as they disturb the composition. But each is beneath the head of a resurrection serpent, and since resurrection leads somewhere, perhaps these blocks conceal a passage that also leads somewhere. The vertical streak of mortar cutting the right serpent cell, separating two large stone panels, is not unusual, but the two small blocks are definitely suspicious and may well lead to other concealed crypts that could elucidate the strange mysteries of this chamber. I also believe there is another chamber below this one, which has not been entered since antiquity, because I detected by tapping what appeared to be a hollow space beneath the stone at the far end of the crypt from where you descend and go in. Also, in my opinion, an expert at hieroglyphic cryptography needs to examine the inscriptions in this chamber for further or double meanings. Just as golden angle design construction is not immediately obvious to the untutored eye, so matters may be hinted at in the texts that straightforward translation does not reveal at first attempt. Sometimes in cryptography, figures can double as hieroglyphs, and this may not have been considered yet. (Photo by Robert Temple)

On the north wall, the serpent and its serpent cell are also generated by a golden angle with the horizontal, the angle being shown by a line drawn from the bottom right base of Sokar's pedestal to the tip of the serpent's head. This can be measured by anyone on top of the drawing in figure 8.25.

That is all we need to consider here about the Denderah crypt. Because it has understandably become something of a cause célèbre among those intrigued by Egyptian mysteries, it was worthwhile to show that it is part of the same complex of iconography and thought that we find at Giza in association with the Sphinx. The theme is the same: resurrection and emergence from the netherworld by means of the golden angle of resurrection and, in this case, also by the breath of immortality that comes out of the blue lotus.

There is one more amazing physical manifestation and occurrence of the golden angle at Giza, which was discovered by someone in the nineteenth century who did not realize at the time what it was that he really had discovered. This was a very strange discovery of my own, too, to find it buried in the data in his book. Some time ago I managed to obtain a copy of this extremely rare book on the Giza pyramids written by a British engineer named Robert Ballard. He was a chief railway engineer for Queensland, Australia, in the 1880s. In 1882, he published his remarkable book, *The Solution of the Pyramid Problem*.<sup>31</sup> A main theme of the book is that the pyramids of Egypt, which he had studied as he passed through the country as a visitor in 1858 or 1859, made expert surveyors' backsights for measuring and reestablishing the boundaries of the fields of Egypt after the receding of the waters of the inundation of the Nile. "Backsight" is a surveyor's term for a known point of elevation (in this case, the heights of the pyramids, which would have been known) toward which a surveyor looks back in order to calculate his present height where he is standing with his measuring instrument, which is called a theodolite. In *The Crystal Sun* I discuss ancient Egyptian surveying methods and published the photographic evidence to prove that in the Pyramid Age the Egyptians possessed perfectly ground convex crystal lenses to enable them to construct primitive theodolites in order to obtain the extreme precision of alignment of the Giza pyramids, which was possible only by means of optical surveying methods and requires magnifying lenses. Ballard's theory about the backsights is very interesting. His idea first came to him as he rode the train from Alexandria to Cairo and noticed the pyramids shifting their positions relative to one another as he moved. But in the process of later compiling data to support his theory, Ballard traveled extensively on foot in circles around the pyramids of Giza, doing drawings of them from a variety of angles along a complete circuit of 360 degrees. This was easier for him in 1858 than it would be today, because the

surrounding area was largely empty. Nor was there yet any smog to interfere with his vision. He stressed that the small Pyramid of Mycerinus needed to be covered in red casing stones, as it partially was (Ballard was unaware that in antiquity the red casing stopped halfway up and became white in the upper half, but this need not affect his argument), to distinguish it from the other two pyramids from certain angles for such sighting purposes. In his book, he printed all his drawings in two colors, with the Pyramid of Mycerinus colored pink, to aid the reader's comprehension. As he circled the Giza pyramids in this way, studying their changing configurations in relation to one another, he was arrested at a particular point by a strange sight. Suddenly, at no angular geographical bearing that appeared to be especially significant to him, a kind of optical illusion presented itself. Taking the apex of the Pyramid of Chephren as north for his sighting purposes, the southwest corner edges of both the Pyramid of Chephren and the Pyramid of Mycerinus appeared to blend into one single edge and to become perfectly aligned with one another along their northeast-to-southwest diagonals.

This is very odd, because as anyone can see from the Golden Giza Plan in figure 7.25, the diagonals of these two pyramids are not really in a direct line with one another at all. If those lines were each carried on toward the southwest, they would be perfectly parallel, but some distance apart. If the two diagonals had been really aligned one behind the other, the merging noticed by Ballard would have been seen from a point that was from true north precisely 45 degrees south of west and 45 degrees west of south, which is the direction both diagonals are pointing from their own separate apexes. However, this is not seen, due to the fact that the diagonals are not in line. It is therefore most extraordinary that the two diagonals *appear to merge* when viewed from an angle all too familiar to us!

The optical illusion then is given of a perfectly triangular chunk being cut out of the southwest corner of the Pyramid of Chephren, with a plug of red stuck in its place into its pale body. (This would have been an even more startling illusion in ancient times, when the casing stones were all in place and their true colors were still bright.) This extraordinary sight is reproduced in figure 8.36, since it is necessary for the colors to be seen for the phenomenon to be fully appreciated. (Bear in mind that Ballard did not realize that the small pyramid was originally only red in its bottom half, so he drew it as wholly red.) Ballard duly made a note of the geographical (not compass) bearing and recorded it as  $206^{\circ} 33' 54.18''$ . He did not see the significance of this angle, and it was assumed to be random. However, he had stumbled on the golden angle without realizing it. The angle just mentioned was viewed from the southwest and is thus  $26^{\circ} 33' 54.18''$  west of south, which makes a precise golden angle with the north-south meridian passing through the tip of the Pyramid of Chephren. Both the southwest edges of the two merging pyramids as seen along that ray appear to become one. But because the diagonals of the two pyramids are not actually geographically aligned on the Giza Plan, the view recorded by Ballard must be a strange optical illusion whereby two diagonals that are not actually in alignment appear to become so at the precise spot where he stood, which was defined by a golden angle to the north-south meridian. I have not been to Egypt since finding this information in Ballard's book, so I have not been able to take this sighting myself. One does not normally wander southwest of the Pyramid of Mycerinus into the desert unless one goes on horseback or by camel, so this would not normally be seen, even in ancient times. It must presumably have some additional significance yet to be discovered. However, it does not point toward any pyramid farther south, as they are all too far to the east. The line runs toward the Fayyum, but it does not appear to strike anything in particular. This line is deeply puzzling, and perhaps it means nothing outside the Giza Plateau context itself.

This drawing appeared as figure 44 in Ballard's book, one among seven similar drawings on a page, with no special attention being called to it. I had to have a pretty sharp eye to spot this, especially as the

angle was given as a bearing, with 180 degrees added to it, so that in a scan for significant angles such as I always carry out when I look at things, it did not jump out and click with my mental “search image” as a number match. I had to excavate it from the data, which is a different and slower, second-order mental process.

This is my last physically demonstrable golden angle at Giza to be presented in this book. Unfortunately for those of us who like answers, it is the most puzzling and bizarre of them all, and it requires a lot of further thought. It has in common with my inclinometer observation from the Sphinx Temple floor the fact that the tip of the Pyramid of Chephren is at the true center of the optical illusion, and that is certainly a crucially important lead in my further detective work. Obviously, I must obtain some photos of this phenomenon from the desert southwest of Giza when I next go to Egypt. My work on the geometrical mysteries of the Giza Plateau has really just begun. Plotting the spider’s web of golden angles is just stage one of unraveling a far more complex Giza Plan. Much more is made clear in my book *Egyptian Dawn*, though I doubt that this subject will ever be exhausted. Or at least, I will be exhausted before it is!

Finally, we can gain further insights into the golden angle of resurrection by considering some further ancient illustrations. First, we can see two other hypotenusal pharaoh/Osirises at golden angles that are depicted in papyri in figure 8.10 and 8.37. The first is one I spotted in a glass case in the Egyptian Museum at Cairo (Papyrus 4891), which appears never to have been discussed by anyone as far as I can discover, and the second is depicted in a well-known papyrus called the Papyrus of Heruben, which has been discussed by Egyptologists on various occasions, and was reproduced by Piankoff. All that needs to be said about these two images is found in the captions to the plates.



Figure 8.36. This is figure 44 from Robert Ballard's book, *The Solution of the Pyramid Problem or, Pyramid Discoveries with a New Theory as to Their Ancient Use*, John Wiley & Sons, New York, 1882. In his book, the British engineer Ballard walked 360 degrees around the three Giza pyramids (at a time when there were no buildings in the way and no smog), making sketches of the mutual configurations of the three pyramids from a variety of angles and cardinal (not magnetic) bearings. He did this because of his conviction that the pyramids were used as backsights for surveying purposes in ancient Egypt to reestablish boundaries of fields after the inundation waters subsided every year. He made the point that the small Pyramid of Mycerinus had to be a different color (it was partially covered in red granite casing stones instead of white limestone) to differentiate it from the other two. Among the many views Ballard sketched, and for which he meticulously recorded the bearings, was this striking one, where the optical illusion is created of the small Pyramid of Mycerinus (in the left foreground) merging and becoming one with the larger Pyramid of Chephren directly behind it, appearing as a kind of red plug in its corner, with the edges and bases of the two separate pyramids perfectly coinciding so that they look like one pyramid. Ballard duly noted the cardinal bearing of  $206^{\circ} 33' 54.18''$  or in other words by subtracting the 180 degrees from north to south, constituting an angle with the north-south meridian line of  $26^{\circ} 33' 54.18''$  west of south, which is precisely the golden angle. So Ballard stumbled across another major golden-angle phenomenon at Giza without realizing it, because evidently he did not know the value of the golden angle and did not recognize it. He merely noted the bearing as a matter of routine. I was the one who spotted this in his mass of data.

We have already seen the remarkable images in beaten gold on the Second Shrine from the tomb of Tutankhamun, reproduced in figures 8.16 to 8.19, of the giant Re-Osiris standing at the eastern horizon with his feet in hell and his head in heaven, and the details are given in the captions.

Figure 8.25 is a photo I took of another portion of the beaten-gold Second Shrine of Tutankhamun. Here we have Osiris portrayed as a prone mummy, lying on his stomach, into whose mouth the “voice of Re” (the *logos*) is pouring as a stream of light. This is yet another form of the hypotenusal Osiris rising in



the east at the golden angle. As explained in the caption to the photo, a line drawn from the top of the solar disk through the eye of Osiris, if continued to the base on which he is lying, forms a golden angle with the horizontal plane. This is another clear portrayal of the golden angle of resurrection.

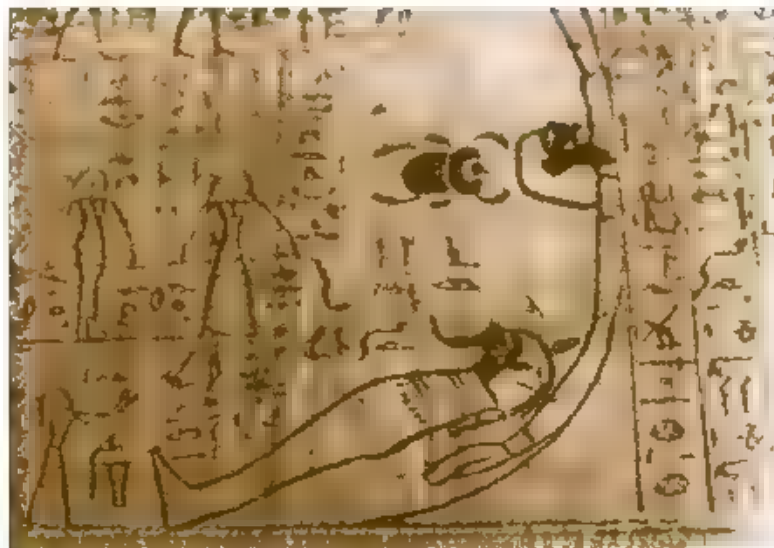


Figure 8.37 This papyrus inside a glass case in the Egyptian Museum in Cairo shows another hypotenusal priest or pharaoh as Osiris. The papyrus is Papyrus 34891, on display in Case 530 in Room 29. Here once again, the mummified pharaoh, identified in his inert state with Osiris, but who through resurrection has "become a Horus," forms the hypotenuse (which was known to the Egyptians, according to Plutarch, as Horus) of a triangle, in this case a golden triangle, such as that projected by a shadow onto the south side of the Great Pyramid at sunset on the winter solstice. (The deceased pharaoh is also affiliated through this means with the mummified god Ptah, who is also "south of his wall," as many inscriptions state.) The angle at the pharaoh's feet, if measured by the line protruding from the top of his head, forms the golden angle. A poor imitation of this portion of the papyrus design from the Twenty-third Dynasty is found in the Papyrus of Djed-Amun-luf-ankh (the name of a priest of Amun from Thebes, whose funerary papyrus it was), also in the Cairo Museum, and reproduced as Number 27 in Alexandre Piankoff, *Mythological Papyri*, Pantheon Books, New York, 1957. In Piankoff's book, he shows no knowledge of the papyrus in this photo, but as Number 2 he reproduces the Papyrus of Heruben from Cairo, which is shown in figure 8.10, and which contains a very important hypotenusal figure. (Photo by Robert Temple)

Another graphic illustration on this shrine of beaten gold of the "call of light" (*logos*) emitted by the sun is found in figures 8.40 and 8.41. The sun as a uraeus serpent spews light into the forehead of a mummy of the blessed dead to reawaken him, and a series of other mummies have rays of light shooting into their foreheads from stars, so they too may be resurrected. In figures 8.46 and 8.47 is another scene from this shrine, in which is depicted Horus emerging from his father, Osiris, in the netherworld preparatory to rising as Horus-in-the-Horizon. This is another version of the same process that we have seen in figure 8.20 from the tomb of Rameses VI.



Figure 8.38. A prone mummy figure of Osiris as the sun in the netherworld, into whose mouth the "voice of Re" as a stream of

light is pouring from a small solar disk. This is in beaten gold on the Second Shrine of Tutankhamun in the Cairo Museum. Directly beneath the small solar disk is a pair of inverted legs, which means movement in the netherworld (which everybody enters upside down). The outstretched arm of the netherworld solar Osiris is the same as the outstretched arm of the hypotenusal Osiris-as-Horus figure rising at Giza, and like it, this figure forms a golden triangle. A line drawn from the top of the solar disk through the eye of the prone mummy strikes the base on which the mummy lies at a point that creates a golden angle, which is the same golden angle of resurrection that we find at Giza, and the angle on which the entire Giza Plan and positioning of the Sphinx are based. At far right, an upright, friendly Nehaher serpent stands in a rectangular array of vertical light rays, above which a pair of walking legs say "moving." Above them, another solar disk is emitting light. At far left, two androgynous, lion-headed figures have had their corpses resurrected by the light of Re, and they are following him. The arms concealed under the cloaks are a well-known priest's pose, indicating that they are carrying secret things, so these figures probably really represent priests in procession wearing lion heads, who represent those resurrected dead, as part of a ceremony. See also the drawing of this scene in figure 8.39 below (Photo by Robert Temple)

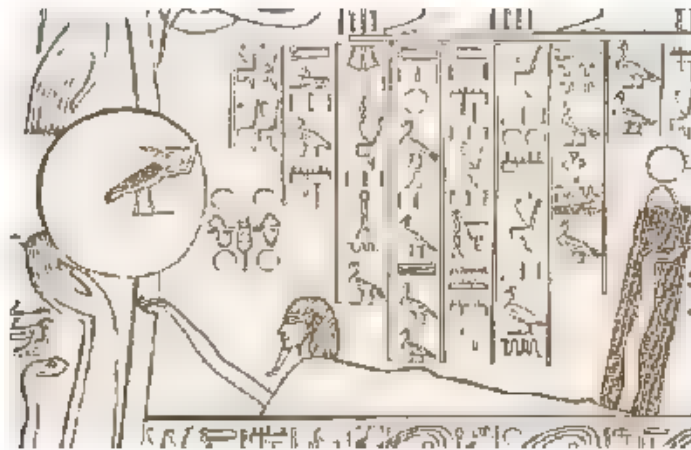


Figure 8.39 A drawing of the scene seen in figure 8.38. Taken from Alexandre Piankoff, *The Shrines of Tut-Ankh-Amon*, Pantheon, New York, 1955, figure 42, opposite page 128.



Figure 8.40 This mysterious scene in beaten gold from the Second Shrine of Tutankhamun shows a cobra called the uraeus spouting a stream of light from its mouth. According to one of the creation traditions of the Egyptians, the divine "word" (which became the *logos* of the Greeks and later the *Logos* of the Gospel of John in the Bible, where "In the beginning was the Word") was uttered and creation came into being as a result. However, what the Greeks and Christians missed in this concept, when they later adopted it, was that the "word" was not meant to be audible, but was in the form of *light*. To the ancient Egyptians, the sun (Re) "spoke light." Here, the "word" or *logos* as a stream of light strikes the forehead of the first of a row of sacred mummies (there are two more to the right, beyond the photo). The uraeus represents Re, the sun, and the stream of light is meant to be the graphical representation of the voice of Re, who had a "fiery call." Each mummy also has a star sending rays of light into his forehead. In front of each mummy is its *ba*, its spiritual force that has survived death. The *ba* was depicted by the Egyptians as a bird with a human head, the bird body symbolizing the ability of the *ba* to flit around wherever it likes, like a bird. Above the head of each *ba* in this picture is a pair of striding legs, to emphasize the mobility of the *ba*. Re is "calling" the *bas*. Each *ba* is standing on four vertical light rays. As John Darnell says "The *ba*'s whom Re is said to call appear as though hovering on waves of light before the standing mummies. The *ba*'s, when summoned by Re, enter into the entourage of the sun, following alongside the other *ba*'s already called into the following of Re" (p. 106). The Egyptian cryptographic text that goes with this picture refers to "the light of Re having entered their corpses. When he calls their *bas*, they set out after the (other?) *ba*'s. Re calls them, and they come forth from the two caverns (?). When the one who is in his disk calls to you, your *ba*'s ascend towards the one who



created you" (pp. 104–5, Darnell) This picture stresses the importance of the call of light uttered by the sun and its ability to waken the dead to resurrection, which was seen in its ultimate form by the rising sun represented by the hypotenusal mummy of the dawn that rose with its feet at the Sphinx and the tips of its hands at the tops of the Giza pyramids (Photo by Robert Temple)

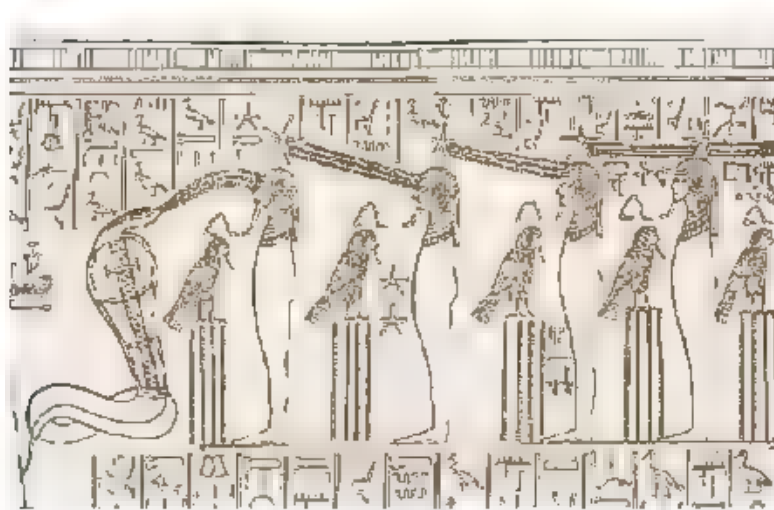


Figure 8.41. This is a drawing of the image seen in figure 8.40 Taken from Alexandre Piankoff, *The Shrines of Tut Ankh-Amon*, Pantheon, New York, 1955, figure 42, opposite page 128.

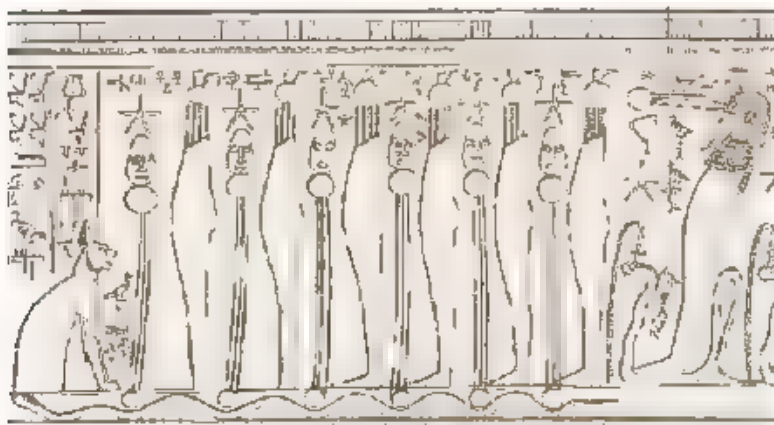


Figure 8.42. This is a drawing of the scene shown in figure 8.43 Taken from Alexandre Piankoff, *The Shrines of Tut Ankh-Amon*, Pantheon, New York, 1955, figure 42, opposite page 128.

Another hypotenusal Osiris appears on this golden shrine at the golden angle (this time vertical rather than horizontal) in the scene depicted in figures 8.43 and 8.44. At the right of this image in figure 8.43 is a leaning Osiris, standing with his feet in a protective Mehen serpent (Enveloper), and with the light of the sun streaming into his forehead to resurrect him. However, the photo does not encompass the entire scene. In figure 8.44, which extends farther to the right in the scene, we see that there is really a series of six hypotenusal Osirises rising from the dead at the golden angle of resurrection. If one draws a line along the beard, face, and forehead of each figure until it reaches a vertical line that is perpendicular to the base of the scene, one gets a golden angle. Further details are given in the captions. No fewer than seven hypotenusal Osirises being resurrected at the golden angle at the eastern horizon—becoming Horus-in-the-Horizon—are shown on this one golden shrine alone.



Figure 8.43. An image in beaten gold from the Second Shrine of Tutankhamun. At right, the first of a series of Osirises leaning backward at the golden angle is irradiated by light streaming into his forehead (there are other Osirises to the right of him, see figure 8.44). This light, the "word" of the sun who speaks light, revives Osiris and brings about his resurrection, signified also by his leaning backward at the golden angle of resurrection (the golden angle is between him and the vertical plane). He stands in the protective folds of the Mehen serpent, the Enveloper, who keeps him safe while in the netherworld. At far left, a cat representing the eye of the sun presides over six headless entities. These entities are the blessed dead whose heads, now the property of the sun, will be returned to them because they have been just and are to be spared from annihilation and given eternal life. Individual suns stream light down into the headless torsos, and above each head is a star. The heads of the saved and blessed entities are called "those relating to the pupil of the sun's eye." The sun speaks to these entities: "When he calls to them they live by the breath of his mouth do they receive their heads" (John Darnell's translation). It is the light of the sun that is "the breath of the sun's mouth," since the sun's mode of speech is to emit light. It is this breath that streams as light down into the headless mummies. During the third hour of the night, the heads are returned to the blessed dead, and Anubis ties them back on. See also the drawing of this scene in figure 8.42. (Photo by Robert Temple)

Also relevant are certain of the wall paintings in the tomb of Rameses VI, of which we have already seen three, the birth of Horus from the mummy of Osiris (figure 8.20), Osiris in his Hidden Chamber (figure 7.7), and the Fifth Hour of the Night with Sokar in his cavern beneath a pyramid topped with a human head (figure 7.8). One other may be seen in figure 7.9. Although the captions of all of these give much necessary information, it is important to put these images in their joint perspective. The arduous journey of the sun god in his boat through the netherworld every night, with its perils and vicissitudes, always culminated in his rising successfully in the east, with the aid of the beetle Khepri, who pushed him over the horizon, often into the welcoming outspread arms of Shu, god of air and sky. But when he did emerge, reborn and resurrected, he did so as a resurrected Osiris who had become a Horus-in-the-Horizon, manifesting himself at the golden angle of resurrection. In figure 8.45, drawn from a painting in the *Book of the Hidden Chamber* on the walls of the tomb of Rameses VI, we see this culmination of the twelfth and final hour of the night, with the dawn breaking and the hypotenusal Osiris transforming himself into Horus-in-the-Horizon.



Figure 8.44. This scene from the Second Shrine of Tutankhamun shows six Osiris entities rising from the dead at the golden angle from the horizon at Rostau (Giza). Each is protected at its feet by a guardian Mehen serpent. The first Osiris entity is called

"he of Mehen." The second is called "born of corpse," the third is called "born of members," the fourth is called "begotten one," the fifth is called "one related to going about," and the sixth is called "leaping of corpse." "Leaping" is from the verb *nehep*, to leap. This verb refers to ascension (which was regarded as leaping) from the netherworld, and there were also *nehep* serpents (see one in figure 8.27) that stood up vertically or leaped up, which were friendly and associated with resurrection. These Osiris entities are the blessed dead, who are being revived in their mummy state by solar disks beaming light into their foreheads. Soon they will rise above the horizon and be reborn. We know they are being resurrected because their bodies constitute hypotenuses of triangles containing golden angles (which are not drawn in the scene, but which had to be used by the draftsmen in constructing the picture). If one draws a line along the beard, face, and forehead of each figure until it reaches a vertical line perpendicular to the base of the scene, one gets a golden angle, and if the hypotenuse is continued to the baseline, a triangle. These blessed dead are therefore mini-Osiris about to be reborn as Horuses. The text specifically locates this scene at Giza by saying: "You will fly up from Rosetau by day, in exultation every day; you will go about on earth daily" (translation by John Darnell, page 120. Ref. also Darnell plate 10, A Scene 3). Drawing taken from Alexandre Piankoff, *The Shrines of Tut Ankh-Amon*, Pantheon, New York, 1955, figure 42, opposite page 128.



Figure 8.45. The final and twelfth hour of the sun's journey through the netherworld, which culminates in the sun's rising at the eastern horizon (at right). In the middle register at the left, the *ba* of the sun is in the last stage of its journey over the water (represented by the wavy lines contained in what looks like a pedestal beneath the boat). The huge serpent in the center of the picture is called the Nau serpent, who is a protective deity. He is described in the text as being 1,300 cubits (2,332 feet) long, and "he moves toward the birth of the god" (i.e., the rising of the sun as Osiris/Horus in-the-Horizon). It is his job to clear the way for the sun god. Nau also has the meaning of Divine Path, and for some unknown reason, the Nau serpent was associated with the twenty-third day of each lunar month. He is clearly astronomical, but we do not yet fully understand his significance, or what the 1,300 cubits refers to. In the text he is also called the Great Ka, Life of the Gods. The Khepri beetle, symbol of the rising sun, is at the horizon, presiding over the red sun of the dawn, who is being welcomed by the head and outspread arms of Shu, god of the air and sky. The hypotenusal Osiris, who is always associated with resurrection and the revived sun and has now become Horus-in-the-Horizon, is at bottom right, at a golden angle (his head making a golden angle with the vertical plane). Directly in front of the hypotenusal Osiris as Horus is a procession of ten sun worshippers, followed by four priests, behind whom is the Nehep serpent standing on his tail as a symbol of resurrection, spewing a stream of light from his mouth, and with the ankh, symbol of life, beneath his jaw. Twelve sun worshippers form the right side of the procession in the top register. In the middle register, the figures are the towers of the solar boat. (From Alexandre Piankoff, *The Tomb of Rameses VI*, Pantheon Books, New York, 1954, figure 87, opposite page 312)

The archetypal setting for all of this was at Giza. That was the Place of the Golden Angles, the Place of Resurrection. It was truly Golden Giza, where eternal life awaited the blessed dead. In this setting, presided over by the guardian Anubis, carved as the largest statue in the world, the resurrected sun flashed on the gold-plated tips of the three Giza pyramids, and the beams of light struck the tip of the Pyramid of Chephren literally at a golden angle through the air. All the key monuments were knitted together tightly by overlapping and interconnecting golden angles in a maze so complex and so unobvious to the uninitiated that it has escaped detection until now, approximately 4,500 years after its pattern was last known, recognized, and understood.



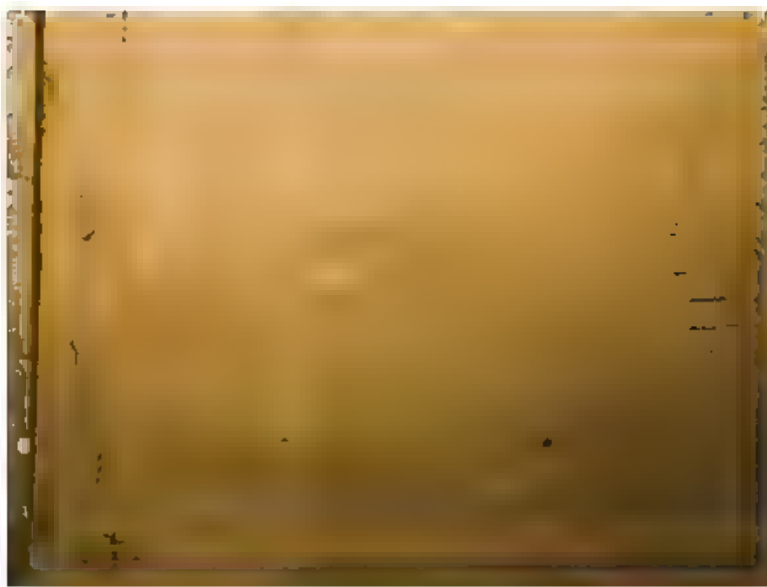


Figure 8.46. In the center of this picture in beaten gold from the Second Shrine of Tutankhamun lie two mummies in their sarcophagi. They are both encircled by the protective and friendly netherworld serpent named Tepi, "he with the head," who is always shown with a human head. It is his job to keep the mummies safe and, because he emits light, to provide illumination in the darkness. He is the same human-headed serpent as the one depicted in figure 8.6, a scene from the tomb of Rameses III. The top mummy is labeled "he of the sarcophagus" and represents the dead Osiris wearing the white crown of Upper Egypt; he also represents the corpse of the sun during the night hours when he is in the netherworld. Below him is a mummy believed (on the basis of similar illustrations elsewhere) to be that of the netherworld Horus in the process of emerging from the dead Osiris just prior to the sunrise, when he will be represented as the hypotenuse of the golden triangle who leaps above the horizon and becomes Horus-in-the-Horizon, particularly at Giza. To the right of the encircled mummies is a strange container known as the Chest of Re. It contains secret things. The arms and four hands are a cryptographic inscription that in addition gives a double meaning. Cryptographically, the hieroglyphs can be read "chest," but the four hands also stand symbolically for "the limbs of Osiris" that lie concealed in the mysterious chest. Although I have solved the mystery of what the ancient Egyptians were really referring to by their myth of "the limbs of Osiris" and have explained this at length in my study of the Temple of Seti I and the Osireion at Abydos, with physical evidence to make it clear, the explanation is far too lengthy for summary here. Beneath them, and seen more clearly in the accompanying drawn version of this picture in figure 8.47, the ram's head of the netherworld form of the *ba* (spiritual force) of the sun is seen rising out of the earth, which represents the imminent sunrise. When he rises he will be "the great corpse which is in the horizon, the secret divine corpse" (John Darnell, pp. 90–93), who is shown as the hypotenusal mummy rising at Giza. (Photo by Robert Temple)

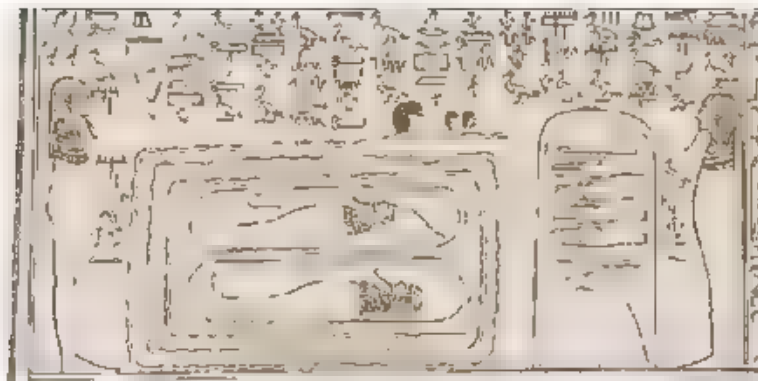


Figure 8.47. This is a drawing of the image seen in figure 8.46. Taken from Alexandre Piankoff, *The Shrines of Tut Ankh-Amon*, Pantheon, New York, 1955, figure 41, opposite page 120.



Figure 8.48 A magnificent Old Kingdom carving of a solar ram, who has risen from the horizon and is triumphant in the sky.  
(Object in the Egyptian Museum at Cairo; photo by Robert Temple)

We now know that at Giza there are multiple esoteric connections between the key points of the main structures, which define their size, shape, and location, based on lines drawn by some planner on a map and then carried out on the ground by surveyors and construction engineers

The location and dimensions of the Sphinx are therefore not accidental. They and the Great Pyramid, the Pyramid of Chephren, and the Pyramid of Mycerinus are all mutually defined. All took their sizes and positions from each other, and all were part of a simultaneous plan. Giza is a unity

Truly this plan is magnificent and beautiful.

Now perhaps we may at last have a true understanding of the Great Sphinx of Giza. It was originally a gigantic statue of the guardian Anubis, crouching at the entrance to the Giza Plateau. It was an island surrounded by a moat filling the surviving Sphinx Pit, most commonly known in ancient times as the Jackal Lake, which was filled with water from the Nile inundation and was also topped up by water carried down a specially constructed drain to catch any rain that fell higher up the plateau. Sacred ceremonies took place in, on, and around this moat; they are described often in the Pyramid Texts and later texts as well. During the century and a half of chaos, floods, drought, and famine of the terrible time known as the First Intermediate Period, when the government collapsed and mobs ran amok smashing everything in their rage (following the Sixth Dynasty, which was the end of the Old Kingdom period), the head of Anubis must have been drastically mutilated. We know that during this period the statues were smashed in the adjoining Valley Temple, so it stands to reason that rampaging mobs would also smash the head of Anubis at the same time.

When order returned under the Middle Kingdom and the Twelfth Dynasty was established, and an attempt was made to reconstitute Egyptian civilization (though the art of building stone pyramids could never be recovered and was lost forever), the third king of that dynasty took an interest in the mutilated statue of Anubis. That king was Pharaoh Amenemhet II. Because the head of Anubis was ruined beyond repair, he had a new and smaller head carved out of the neck. That head was a human head, and its face was his own. He was clearly not a man who suffered from excessive modesty or lack of feelings of self-worth.

By the time the New Kingdom came along centuries later, after yet another era, known as the Second Intermediate Period, a young son of the king was out hunting on horseback on the deserted Giza Plateau,

which was largely abandoned and full of wildlife, and he became tired and looked for some shade in which he might rest. He did so in the shade afforded by the head of Amenemhet II, which was sticking up out of the sand. But of course no one knew that the head was that of Amenemhet II, because no one remembered Amenemhet II any longer, much less what he had looked like. The young man assumed that this was the original head of a gigantic buried statue, traces of the back of which were also visible. This young man fell asleep and had a powerful dream. In the dream, the statue spoke to him and said that if he would clear it of sand and show his piety, the god of that statue would make him king of Egypt. (Being a younger son, this was not expected to happen to him.) We do not know how much truth there is in this story, but it is what the young man ordered to be carved in stone and inscribed on the famous Dream Stela between the Sphinx's paws after he had cleared it of sand. That Dream Stela still survives (see figures 3.3, 3.5, 3.7, and 3.8). And the young man did indeed become king of Egypt, the pharaoh whom we call Thutmosis IV, or Thothmes IV. The Dream Stela may largely have been propaganda intended to legitimize his succession, but that doesn't really matter to us anymore, as he is not around for us to complain about his rule or misrule, whichever was the case.

It never crossed the mind of the future Thutmosis IV that the statue that he cleared of sand was not the original statue in its entirety, and that its head had been remodeled. He strapped a stone royal beard onto the face, drilled a hole in the top of the head into which he inserted a pole with banners, painted the statue in garish colors, hung ornamental collars around its neck, and promoted it as an idol to be visited and worshipped. The altar for doing this was conveniently placed in front of his own dedicatory Dream Stela. Thus, this idol was as much a cult of himself as it was of the spirit of the statue. It was a way of celebrating his pharaohship. He claimed that the body was that of a lion. Even if he noticed that it did not really look like one, he chose to overlook that fact, because the lion was a royal beast, and he *wanted it to be a lion*. So everybody believed in the Emperor's New Clothes, and they still do.

It is amazing how effective propaganda can be.

But what we have needed to recapture is the true purpose, origin, and nature of the Sphinx of Giza. In doing so, we have honored Maāt, Cosmic Order. We can now grasp something that had seemed lost to us forever, the living soul of the Age of Giza. May it bless us in our future endeavors.

## ***Accounts of the Sphinx from Roman Times to 1837***

## Section 1

# ACCOUNTS OF THE SPHINX FROM ROMAN TIMES TO 1798

The following extracts appear in chronological order and are translated when necessary into English—those from French by Olivia Temple and those from German by myself. The notes in brackets within and following the extracts are by me as well

PLINY (1ST CENTURY AD)

*Natural History*, Book 36, Chapter 17

Translated by D. E. Eichholz, Loeb Classical Library series, vol. X of Pliny, Harvard University Press, USA, 1971

Page 61

In front of them [the pyramids] is the Sphinx, which deserves to be described even more than they, and yet the Egyptians have passed it over in silence. The inhabitants of the region regard it as a deity. They are of the opinion that a King Harmais [corruption of the Greek Harmachis; other texts of Pliny say Amasis] is buried inside it and try to make out that it was brought to the spot: it is in fact carefully fashioned from the native rock. The face of the monstrous creature is painted with ruddle [i.e., painted red] as a sign of reverence. The circumference of the head when measured across the forehead amounts to 102 feet, the length is 243 feet, and the height from the paunch to the top of the asp [uraeus] on its head is 61.5 feet.

[Pliny is the only classical author to mention the Sphinx, apart from the following indirect reference by the Roman poet Lucan. The Sphinx is not mentioned by Herodotus, Diodorus Siculus, Strabo, or any others.]

LUCAN (1ST CENTURY AD)

*Pharsalia*, Book IX, 156

Translated by H. T. Riley, Bohn's Classical Library, London 1890

Page 344

Dragged forth from the sepulchres of the pyramids, shall not Amasis and the other kings float for me upon the stream of the Nile? For thee unburied, Magnus [Pompey], let all the sepulchres pay the



penalty . . .

[There is general agreement among those few scholars who have noticed this line in Lucan's epic poem about the civil war between Pompey and Julius Caesar that the reference to Amasis is to the tradition in Roman literature at that time that he had been buried at the Sphinx. (There was never any tradition that Amasis had been buried in any of the pyramids themselves ) Riley, the translator, has even added a footnote to this effect (page 344, note 4).]

ABD AL-LATĪF AL- BAGHDĀDI (1220 AD)

*Relation de l'Égypte* French translation of "Abd-Allatif " from the Arabic by Silvestre de Sacy (Paris: Treuttel et Würtz, 1810)

Pages 179–80

A little more than a bowshot from these pyramids, one sees the colossal figure of a head and a neck, which come out of the ground. This figure is called *Abou'lhaul*, and it is said that the body to which this head belongs is buried under the ground. In judging the dimensions of the body from those of the head, it ought to be 70 cubits or more in length. One sees on the figure a reddish tint and a red varnish, which has a vivid freshness. This figure is very beautiful, and its mouth has an air of grace and beauty. One could say it smiles graciously.

When a perceptive man asked me what excited my admiration most of all the things that I had seen in Egypt, I said to him that it was the precision of the proportions in the head of the Sphinx. In effect, one remarks between the different parts of this head, for example the nose, the eyes and the ears, the same proportions which one sees in the works of nature. Thus it is that the nose of a child matches its size and it is in proportion with the rest of its body in such a way that if it belonged to the face of a man it would be a deformity. The nose of a man transposed onto the face of a child would disfigure it. It is the same with all the other parts of its head: there aren't any parts of it that should not have a certain shape and certain dimensions to be in proportion with such a figure. And if these proportions are not respected, the figure is spoilt. So it is astonishing that in such a huge figure, the sculptor had been able to conserve the correct proportions of all the parts, while nature does not provide any similar example of such huge size, nor anything that could be compared to it.

[Note: The nose of the Sphinx had not yet been disfigured at this date, and the face was still intact.]

Page 225 (footnote 38 of de Sacy)

I have not discoursed further upon the Sphinx, nor the extensive mutilations that have been inflicted on it since the time of Abd-allatif. One can see these details in the notes and explanations put together by Monsieur [Louis] Langlès in his edition of the *Voyage* of [Friderik] Norden [see under date 1757, following, the extract from *Travels in Egypt and Nubia* by Friderik Norden, the 1797/98 French editions of Norden's book incorporate these notes referred to by de Sacy, but they were not in the 1757 French edition]; but I cannot refrain from quoting two modern writers whose evidence confirms after six centuries the account of our author: "This monstrous statue is truly colossal, says Monsieur Grobert, . . . it has been painted yellow, and the color has been preserved until today in the parts which are not damaged."

The other passage is even more important in its details, and by the name of the author who is deemed unimpeachable in this subject. This is Monsieur Denon, and he explains thus:

[This passage is translated under "Denon."]

ABD AL-LATĪF AL-BAGHDĀDI (1220)

Modern English translation of above de Sacy passage: *The Eastern Key: Kitāb al-Ifādah wa'l-I'tibār*

Translated by Kamal Hafuth Zand and John A. and Ivy E. Videan (London: Allen and Unwin, 1965)

Pages 123–25

At little more than a bowshot from these pyramids is a colossal figure of a head and neck projecting from the earth. The name of this is *Abu'l haul* (Sphinx) and the body to which the head pertains is said to be buried under the earth. To judge, from [on the basis of ] the dimensions of the head, of those of the body, its length must be more than 70 cubits. On the face is a reddish tint, and a red varnish as bright as if freshly applied. The face is remarkably handsome, and the mouth expresses much grace and beauty: one might fancy it smiling gracefully.

A sensible man enquiring of me as to what, of all I had seen in Egypt, had most excited my admiration, I answered: "The nicety of proportion in the head of the Sphinx." In fact, between the different parts of this head, the nose, for example, the eyes, and the ears, the same proportion is remarked as is observed by nature in her works. Thus, the nose of a child is suitable to its stature, and proportioned to the rest of its frame, while if it belonged to the face of a full-grown man it would be reckoned a deformity. The nose of a grown man on the visage of a child would equally be a disfigurement. The same holds good with respect to all the other members. There are none but should have a certain form and dimension in order to bear relation to such and such a face, and where these proportions are not observed, the face is spoiled. Hence the wonder that in a face of such colossal size the sculptor should have been able to preserve the exact proportion of every part, seeing that nature presented him with no model of a similar colossus or any at all comparable.

TAQIYYU 'L-DIN AL-MAQRIZI (1378 OR 1379)

This passage is taken from the French translation in the Notes of Louis Langlès, *Voyage d'Égypte et de Nubie par Frédéric-Louis [Friderik] Norden*, new edition (Paris: 1798, vol. III), pages 338–39

The blessed Sheikh Mohammed Ssa'im el-Deher, of the Sufi Order from the Monastery of el-Salehhyeh, devised the plan to destroy some of the practices contrary to the law of Allah. We have seen this saintly person go to the pyramids, mutilate the figure of the Sphinx, and dispose of the pieces of it. This figure remains in this state up until today, and since that era the sands inundate the territory of Giza. The inhabitants attribute this scourge [of the sand] to the mutilation of the Sphinx.

BERNHARD VON BREYDENBACH (1483)

*Les Saintes pérégrinations de Bernard de Breydenbach, 1483. Texte et Traduction Annoté, par le Père F. Larrivaz, S. J., Extraits Relatifs à l'Égypte Suivant l'Édition de 1490* (Cairo: Imprimerie nationale, 1904)

Near these pyramids the great idol of Isis [the Sphinx], previously venerated by the Egyptians, is still standing. Beyond, one also sees some vast ancient ruins; previously, the celebrated and mighty capital of Egypt, which had a hundred gates, was also situated there, and it was the birthplace of Saint Maurice and of the Theban Legion.

[Here he confuses Memphis near Giza with the later capital of Thebes in Upper Egypt, which was said to have had “a hundred gates.”]

## *Voyages en Égypte*

The French Institute of Archaeology at Cairo between 1970 and 1988 published twenty-five volumes (some in several parts) of early travelers’ descriptions of Egypt, dating from 1482 to the time of Napoleon. Some volumes contain several travelers’ writings. This admirable series is entitled *Voyages en Égypte*, and was published in Paris. Olivia and I have excerpted every description of the Sphinx appearing in these volumes and she then translated them all from French. This was often difficult, as the language was old-fashioned, and many obsolete words occurred. Some of the passages are translations into French from other languages

JOOS VAN GHISTELE (1482–1483)

Translated from volume 16 of the series *Voyages en Égypte* (1976)

Page 83

Behind these pyramids is found a statue [the Sphinx] of which the head is so large that 4 spans [brasses] are insufficient to encompass it. This statue has the appearance of a human being as far as the shoulders, but from there on it reveals the form of a serpent [he could only see the top of the back, which looked like a serpent], of which the tail is a good 50 spans in length. The whole statue is carved from one single piece of rock. In the vicinity people recount that this head had the habit of speaking, at the time of idolatry, after the fashion of other false gods. One day in those times, a man went there to make some sacrifices; he asked of the Idol what was going to happen to him, and the head replied to him that he would become King and master of Egypt if he wanted to follow its counsels. Thereupon, the man replied that he would follow them, and it happened that this man became King of Egypt as he had been told he would by the head. A little while after his coronation, he returned to the place where the head was, which he decapitated with an ax, saying : “It’s all very well that you have given me counsel so that I can secure Egypt; but from today on, you will not give any more counsel to anyone ” And so it is that since then the head rests upon the ground up until our own time

[Note This amazing folklore survival of a true story over the course of three thousand years has been discussed at length in chapter 3

Pages 452–54

### **The Sphinx of Giza: Idol of Isis?**

Near the pyramids we saw a huge stone idol which had the form of a woman, and we had no doubt that it was a monument dedicated to Isis. Daughter of the Greek Prometheus, of a unique beauty, she had been loved and pursued by the adulterous Jupiter. Having fled far away from her father because of the crime perpetrated, and with the assistance of Jupiter, she made her way to Egypt with a naval fleet, and after a series of wars, she submitted to Egypt . . .

Page 455

### **A Misshapen Rock Near the Sphinx of Giza**

Near the idol of Isis, lies a kind of misshapen rock which—it is said—once formed the figure of an ox, of Osiris or of Apis. On the death of Osiris, legend says, his heart emigrated into an ox, which is the reason that the Egyptians worship the ox. As for Isis, his wife, having reassembled the pieces of his cut up body, she deposited them in a wooden ox, re-covered it with bovine skin and left it to the veneration of the people. With the passing of time, the wooden idol rotted and the Egyptians carved an enormous rock and consecrated it to Osiris.

Page 456

### **A Small Lake with Miraculous Water**

On the other side of the pyramids, not far from the Idol of Isis [the Sphinx] there is a small lake, more memorable for its miraculous property than the abundance of its water. Once a year, for one month, its water changes into blood—a fact of which the Saracens attribute to a perpetual reminder of the first wound by which the water and the rivers of Egypt were changed into blood as mentioned in Exodus 7.

[Note Exodus 7: 17–25, in *The New English Bible* (1970)]:

[Moses said to the Egyptians at the command of the Lord]: “. . . so now the Lord says, ‘By this you shall know that I am the Lord.’ With this rod that I have in my hand, I shall now strike the Nile and it will be changed into blood. The fish will die and the river will stink, and the Egyptians will be unable to drink water from the Nile ” The Lord then told Moses to say to Aaron, “Take your staff and stretch your hand out over the waters of Egypt, its rivers and its streams, and over every pool and cistern, to turn them into blood. There shall be blood throughout the whole of Egypt, blood even in their wooden bowls and jars of stone.” So Moses and Aaron did as the Lord had commanded. He lifted up his staff and struck the water of the Nile in the sight of Pharaoh and his courtiers, and all the water was changed into blood. The fish died and the river stank, and the Egyptians could not drink the water from the Nile. There was blood everywhere in Egypt. But the Egyptian magicians did the same thing by their spells; and still Pharaoh remained obstinate, as the Lord had foretold, and did not listen to Moses and Aaron. He turned away, went into his house and dismissed the matter from his mind. Then the Egyptians all dug for drinking water round about the river, because they could not drink from the waters of the Nile itself. This lasted for seven days from the time when the Lord struck the Nile.]

Page 113a (no modern pagination; pagination derived from the original)

Finally, having come up to the village of Busiris, where the water of the Nile has broken the arches of the stone bridge, it is necessary to go by boat. And after the village of Busiris, there is a long causeway, which goes on to terminate at the desert of the pyramids [The causeway to which he refers culminated, as one approached the Giza Plateau, in the Cheops Causeway, leading up to the Great Pyramid. In those days it was still intact, and the stones had not yet been carried away or built over. Today, not a stone remains. Old engravings show this causeway intact in the seventeenth century, and portions of it intact well into the nineteenth century.]

[This is the Busiris near the Sphinx, not the Busiris that was in the north of Egypt, in the Delta region. The Gizan Busiris was called Djedu (“ghosts”) by the ancient Egyptians.]

Page 113b

Then we came to pass the dike of Busiris, which has been broken in one place, where the water of the Nile has formed a lake (of which the Greeks have taken the occasion to invent the fables of the waters of their Rivers Lethe and Styx: for the embalmed bodies, which were carried to the sepulchre, passed by boat across the said lake, which has completely overflowed and broken the causeway). Those who had ascended well up [the dike] did not have any difficulty in fording across, following the guides, but the others not so high up had to wait for a boat. Nevertheless, some who had stripped their clothes off led the others, mounted, by the halter, enabling them to pass through the water, which was up to their armpits.

Page 115b

Thus we come to the Sphinx or Andro-Sphinx, of which the ancients have spoken so much, which is still entire in the above-mentioned sterile plain with the pyramids. It seems well not to pass it by without saying a little something about it.

*Concerning the Great Colossus named by  
Herodotus Andro-Sphinx and by Pliny  
The Sphinx, Which is a Stone Sculpture in  
front of the Pyramids*

Having well considered the great stone head, which is adjacent to the water of the Nile a little way below the [level of the] Great Pyramid [a remarkable confirmation, if any were needed, of the points made in chapter 6 of this book], we had occasion to admire the works of the Egyptians. And although Pliny had very much exaggerated the size of the pyramids, nevertheless, he was more reasonable in describing the colossus of the Sphinx, which is to the right of the Great Pyramid towards the east.

We do not want to linger too long on the description of the Sphinx, for truly all that has been depicted and written of this creature, from the Ethiopians to the Egyptians, is fable. . . .

This stone sits on a cubic shape, which is only a large sculpted face looking toward Cairo. Its proportions of face, nose, eyes, mouth, chest, chin, and other parts are so well retained that we cannot deny that it is a very grand creation. It doesn't have any similarity to other sculptures of sphinxes. . . .

But this stone of which we speak is still the greatest marvel, for being massively huge, it has a height of 63 feet. Pliny gave it 143 feet in length. . . . It is the grandeur and sublimity of this colossus that is no less a marvel than a great obelisk. We like to maintain that the Romans never made anything from a huge mass of stone which could compare in sublimity and magnificence to the work of a pyramid, an obelisk, or to the Sphinx of which we speak. . . .

[It must be noted that at this time, as units of measurement, French feet were considerably shorter than English feet, so allowance must be made for this in some of these early accounts. On the other hand, Belon errs in saying that Pliny gave a length of 143 feet for the Sphinx, when it was really given by him as 243 feet, and the Pliny measurements seem to be transposed into English feet rather than French feet. Probably the safest thing to do with all the early accounts is to ignore the many measurements that are given of the Sphinx as being irrelevant, since we now know all the true measurements anyway.]

It remains now that we speak of whence the Sphinx has come to the Egyptians. It is that during the sign of Leo and Virgo [he is unaware that Leo and Virgo did not exist to the ancient Egyptians prior to the third century BC], the Nile inundates the land of Egypt, and the Egyptians, wanting to signify their riches [the crops from the rich soil deposited by this inundation], created a sculpted monster, which is a virgin in front and has the body of a lion, and bears the name of the Sphinx, and because it is something made to please, one thus sees this [image] also in [diverse] sculptures. Witness the above-mentioned great head of the Sphinx. . . .

ANDRÉ THEVET (1552)

Translated from volume 24 of the series *Voyages en Égypte* (1984)

Do not expect to see the whole base and foundation of these pyramids, which are in this sandy locality. The sands have covered a good part of them despite the fact that they equal the highest mountains of Egypt in their elevation. [At that time, large mounds of sand-covered rubbish lay against the sides of the pyramids, from the time when they were stripped of their casing stones. Today, all of this has been cleared away.] And this has been seen even more so with the colossi that one calls sphinxes (on account of the monstrous figure and variety that they have), which are beginning to be buried in the piles of sand blown about by the wind.

It is true that I cannot be persuaded, that the colossus which we see there today is not one of these sphinxes which one guesses to be the tomb of some Egyptian king. It represents nothing more than a monster, in that it is made like a man's head, marvelously huge, a body without shape, and of hard

stone. . . Some say that Isis raised the monument after the loss of her friend [Osiris], beating her breast on account of his death. Its head is huge like a tower, being 200 paces broad and about a hundred long. . . Pliny mistakenly spoke of this Sphinx or Colossus, saying it was more admirable and remarkable than all the pyramids: this comparison is about as true in terms of grandeur and size as would be that of comparing a rat to an elephant. And if he had seen it and studied it as closely as I did, he [Pliny] would not have written such nonsense, unless it was the translator and commentator of my own time [Antoine du Pinet, translator of the French version of Pliny published in Lyon in 1562], who mocks the reader by saying that it has a large head, the wings of a bird, and that the rest of the body resembles a dog. This description is also mistaken in that there are no wings, no body, nor any resemblance at all that I know of, and I have seen it nine times in three years.

[The “wings” mentioned by du Pinet in his marginal note to his translation of Pliny may derive from descriptions of the *nemes* headdress, which has sometimes been called winged because of the folds extending to either side of the head. Thevet points out that since the Sphinx was buried in sand up to its shoulders, it was impossible to say in his and du Pinet’s time what its body looked like, and hence it had no discernible resemblance to anything.]

CHRISTOPHER FUERER VON HAIMENDORFF (1565)

*Reis-Beschreibung, in Egypten, Arabien, Palästina, Syrien, etc.* (Nuremberg: 1646)

Pages 59–60

### **A Large Sphinx Which Was Used for Giving Oracles**

In front of the pyramids, in the direction of the city of Cairo, stands a very large Sphinx cut out of the rock, so much covered by wind-blown sand on its lower part that only the head, breast, and back protrude. The head is no less than 53 of my paces [*meiner Schritt*] in circumference [he could walk around it] and similarly also 53 paces tall. An immensely large creature. It has on its right side in its flank a quadrangular hole [*viereckicht Loch*, which could mean either a square or rectangular hole] through which, as we were informed, in olden days one could go inside and could ascend into the head. Inside there the priests spoke, which the Egyptians took for oracles. Nowadays, this hole is mostly collapsed and filled with sand by the wind. [It is unlikely that this is eyewitness evidence that there was an entrance into the Sphinx behind the “cupola,” which now sits up against the right side of the Sphinx, since it is difficult to believe that the Sphinx was cleared down to bedrock for it to be seen at this period when, after all, Haimendorff could walk around the head. This reference must therefore be to the same square hole in the Sphinx’s back reported by many others, as discussed in chapter 2 of my main text. Because the back was only partially exposed, “its right side” as seen by Haimendorff may have been in the center, structurally speaking, but to the right in terms of what was actually exposed to his view, suggesting that the sand had risen higher at this time on the south side than on the north side, which is the case in many of the old photos in this book. The only other alternative would be to suggest that there had been a partial clearance of the Sphinx in the sixteenth century, though Castela said that in 1600–1601 he could only see a head and shoulders, which is confirmed by Sandys in 1611. The fact that Haimendorff mentions the hole immediately after saying that the Sphinx was “an immensely large creature” suggests that the hole may have been seen only after going a considerable distance along the back to reach it.]



*Kurzer und Warhafftiger Bericht/ von der Reis aus Venedig nach Ieursalem/von dannen in Aegypten/auff den Berg Sinai, Allcair/ Alexandria/ und Folgends Widerumb gen Venedig*

[A Short and True Account of the Journey from Venice to Jerusalem, from thence into Egypt, to Mount Sinai, to al-Cairo, Alexandria, and Afterward Returning to Venice; unpaginated, but organized sequentially by date as in a diary (the year of the journey being 1565)] (Leipzig: 1579)

December 13 [1565; “Den Dreyzehenden December”]

The following day we left early and several of us rode to the place where the pyramids stand. As we approached it, we first encountered a huge standing head cut out of stone, which rose very high, as shown in this figure. [He refers to a crude woodcut opposite, showing a woman’s head and torso with two breasts, and hair descending to either side to the extent of the Sphinx’s lappets, which is shown protruding from the sand directly below the breasts ]

This head is the height of three men and stands straight up from a neck, it is 8 fathoms [about 50 feet] in circumference, and from ancient times has been called *Imago Isidis*, that is, the effigy of the goddess Isis. This Isis of which the image has the name has also been called *Io* and is a daughter of the King *Inachos* in Greece, which king in Egypt is called *Osiris*, where he is her husband. There she is called *Isis*, who, after she died, was considered a goddess, and this image was set up to honor her. The local inhabitants worship it and honor it as a goddess. They are also in the habit of offering a sacrifice of a goose at the usual time, which offering they call the *Isiaca* [The noun spelled in the original, *eine Ganz*, is a sixteenth-century form of *Gans*, “goose.”] Concerning this, consult Juvenal, *Satires*, 6: *Si candida iusserit Io*, and recall Lucian’s *Dialogues* in three volumes. [No reference is given, so we do not know to which Dialogue by Lucian he is referring. His reference to the Sixth Satire of the Roman poet Juvenal is to lines 526–41, “if the white *Io* shall so order,” *Io* here being identified with *Isis*, and a mention by Juvenal that a fat goose was offered to *Osiris* by a priest dressed as *Anubis*. Juvenal spoke of *Isis* giving a command “by the voice of the Goddess herself,” presumably referring to the oracular pronouncements issuing from the Sphinx.]

This image [the statue] is entirely hollow on the inside, and one can enter it underground from a distance by means of a narrow passage made of stone, through which one can pass secretly. By means of this passage, the heathen priests entered the head and spoke to the people, making announcements by the babbling of the head, or else the effigy did this by its own means.

Hard by this head are the three pyramids just mentioned. . . .

JEAN PALERNE (1581)

Translated from volume 2 of the series *Voyages en Égypte* (1971)

A little to the right of the Great Pyramid is a massive head looking toward Cairo, not a little wonderful, for apart from the fact that it is made from a huge piece of marble lying on its base, in size it has a circumference of around 100 feet, and in height taken from the chin toward the top of the head, some 60 feet. Some people take it to be a monstrosity, having the face of a man and the body of a lion. As regards to the body that it has, it is all eaten away and corroded, appearing nevertheless to have traces of color on the face, with ears of huge proportion, the remains are well enough proportioned.



As has been said, one knows that the Egyptians wished to signify the wealth and fertility of the land that the inundation of the Nile produced, while the sun was in the signs of Leo and Virgo represented by a monster having the front half of a virgin and the back end of a lion: and they called it Sphinx: nevertheless, it had the face of a man, not of a woman.

Other people say that this head served in the past as an oracle. And happy was he who could be buried nearby. This is made apparent by the large number of sepulchres that are round about here . . .

PROSPER ALPIN ALPINUS (1581–1584)

From his *Histoire Naturelle de L'Égypte*

Translated from volume 20 of the series *Voyages en Égypte* (1979); the whole work appears in five parts from 1979 to 1980 and includes volumes 21 and 22 of the series

Part I, page 68

Chapter VI: “The Pyramids and the Great Colossus Named Sphinx,” pages 58–68.

### The Sphinx

But last of all we come to that great colossus called Sphinx, near to the first pyramid and made from an enormous monolith. This massive rock is made of marble [i.e., limestone. Travelers have often mistaken the nature of Egyptian stone, also, they have often gotten the descriptions wrong of stones that are less common in Europe, such as rose granite. The Sphinx is made of limestone, since it is a rock of the Plateau of Giza recut and finished by man.] It presents an immense and very large face, looking towards Cairo and sculpted in every way with great competency. That is to say, its chin, its mouth, its nose, its eyes, its brow and its ears seem to be cut with a profound knowledge of the art of sculpture. There does not appear to be in the stone any opening by which one could go inside, but it is likely, as we have said of it, that one entered into the colossus from the Great Pyramid nearby. And, since the Sphinx on occasion gave [oracular] responses, it is likely that inside it contains some empty parts into which the priests would go in order to be able to reply on its behalf.

Page 60

But now we will talk about what we saw inside the Great Pyramid. For no one, it seems to me, has properly described the interior. Until 1584, this pyramid only had one door by which you could enter. But, this past year [1583/1584], the Bassa [Pasha] Ibrahim, the deputy king of Egypt, urged by curiosity, or rather by an African sorcerer [or witch doctor], that a valuable treasure was hidden in the pyramid, ordered that the entrance, which was very narrow and made access difficult, be enlarged—by cutting into the pyramid so that a man can now go inside without stooping. The Bassa even, at first, decided to hollow out a shaft inside the pyramid and to fill it with gunpowder to completely destroy the monument. But he changed his mind at the advice of George Hemi, now the Illustrious Consul of Venice (for, I say, in doing so he would have greatly endangered the whole town).

Page 61

But now I speak of the entrance to this pyramid. I have said then, that the pyramid only had a means of entry by a single door, at the base, in the middle of one of the sides. This entrance gave access to nothing important. So, in the stone wall of the pyramid, nearly at the base, in the middle of one side,

there is a hole, about 5 paces long, similar to a section of a pyramid with four sides [he is referring to the angled arch above this entrance], with a more spacious opening and larger outside, but narrow and rounded on the inside. At first very large, this opening gets smaller by slow degrees and comes to an end with a long and steep passage. Thus, the opening of this hole, on the interior, becomes narrow and confined, to the point where a man stretched out on the ground on his stomach and crawling like a snake has difficulty entering. [This is the Descending Passage, which at that time was still nearly blocked by sand and rubbish at the bottom.]

### **Inside (The Interior)**

Once inside, one comes across a large space to the right, from which there is a shaft, quite narrow and almost filled with sand and stones [This is the entrance to the ascending “well shaft,” which is found near the bottom of the Descending Passage. The sand and stones were finally cleared from above by Captain Caviglia in 1817.] It is certainly of this well that Pliny himself, among the ancient writers, speaks

[Pliny speaks of the pyramids more with irony than admiration. He mentions this well “86 cubits, which, one thinks, received water from a river . . .”]

Page 63

### **The Well**

But we think that we should not pass by in silence another peculiarity which also excites admiration on account of its superiority; it concerns a well which we encountered after our entrance into the pyramid. We found that it was at least 70 paces deep and did not contain any water. And I shall tell you how we were able to verify this.

From a mountain called Liban had come to Egypt the reverend brother Paul Bigi, (*janensis*, as I have heard tell) [indicating his place of origin] from the order of Preaching Friars, a man who was very knowledgeable in all kinds of sciences, specializing in mathematics and mechanics: with the help of bronze clocks, he made a sphere by means of which one could observe with great exactitude all the movements of all the celestial bodies and especially the planets [Presumably, this was an orrery]. With the same competency, he made in Cairo, for Assan [Hassan], the deputy king of Egypt, a little gold boat which, moved by clockwork, accomplished by itself all the movement essential for navigation. As soon as it was finished he showed it to us on its own it moved forward, backward, and around, the sails unfolded and folded up again, the anchors were raised, the bronze missiles were automatically fired; one heard the sound of trumpets and all the things that vessels usually do.

Such was the intelligence of this man, that he so closely examined everything with more care than other people. One day, he happened to come with us to look at the pyramids, and once inside the large one [the Great Pyramid] he examined with much care and in great detail what he found there. As a result he came to the idea that the pyramid went deep into the earth before it was raised above the surface, and he suspected that the well had not been made for receiving water but rather to serve as a means of access toward the base of the pyramid.

To verify his hypothesis, he employed some local people, without regard for the expense, so that they could clear the entrance to the pit, filled with earth and stones, and free the passageway [the Descending Passage]. After that, with a long rope introduced into the well, he descended [from the Grand Gallery], with ourselves and some other people for about 70 paces, and with ease, saw that the

cavity of the well had, here and there, some jutting stones, like cornices, which made the descent easy and without danger. Once we were about 70 paces down (as we said before), we found two square passages joining again, in the empty space where the well converges, those which we had encountered in the upper parts of the pyramid: one leading to the stone Sphinx and the other to the second pyramid, the one which has no way of entering. [At that time there was no known exterior opening into the Chephren Pyramid, it was opened in 1818 by Belzoni.] We would have got through to these monuments if we had not found the passages obstructed by stones that had fallen and if we had not believed that there were similar subsidences ahead

Thus, this well had not been hollowed beforehand to provide the necessary water for construction, as [Pierre] Belon had mistakenly believed. It had been constructed to make possible a way to go and see the great stone Sphinx which had been built not far from the pyramid, as well as the second pyramid called Sepulchre of the Queen [Chephren's Pyramid], to which there is no exterior access. This great depth of well is even mentioned by Pliny, who gives it 86 cubits. Relying on his evidence, Paul Bigi wanted to explore even deeper down into it.

Page 67

### **The Second Pyramid**

We come then to the second pyramid [of Chephren], which seems a little smaller than the first, and is a stone's throw away from it. There are no steps that can allow you to go up it on the outside. Furthermore, one sees that all the sides are of smooth marble, perfectly polished, and even until now one cannot find any entrance that gives access from the exterior. Consequently, given that it contains, as all the Egyptians truly believe, the tomb of a king, or, according to the opinion of many, of a queen, one could assume that one could enter into this pyramid from the large one [the Great Pyramid]. It is this that the Rev. Bigi immediately supposed and later told us that he had verified: one entered by the well and through the stone passages dividing at the bottom of the well, which we confirmed with certainty with the aid of a compass, namely that one passage went toward the nearby Sphinx, and one passage went toward this pyramid.

[This is a most extraordinary account. First of all, the Pyramid of Chephren is described as if it had most or all of its casing stones intact as late as 1584. But second, two square passages are said to have been encountered in the well shaft of the Great Pyramid, either at the point of what is called "the grotto" or at the point where the well shaft ends by opening into the Descending Passage, which passages joined one another and led off to the southeast and the southwest, and were blocked with stones and subsidences but were presumed to lead to the Sphinx and the Pyramid of Chephren. There is no knowledge of any such passage entrances today leading from the grotto, but then there are few if any people living who have ever been down the well shaft. This matter clearly requires some further study. Can it be that the entrances to two such passages have been obscured since the sixteenth century and forgotten? Several people explored the well shaft in the nineteenth century and early twentieth century, and they saw nothing of these passages. The grotto area is a small chamber containing much wet sand and gravel, and it is presumably possible that some of this fell across the entrances to some passages. So few people have ever scrutinized this grotto that we cannot be certain whether Alpin's account has any basis in fact. But if he had not encountered two passages, why should he claim that he had? It is at least worth checking out by a close inspection of the well shaft, but then access to the well shaft is now so restricted that even the Giza inspectors have not been down it and regard it as unsafe. Certainly, the well shaft is a claustrophobe's

worst nightmare, being exceedingly narrow and extremely deep and requiring one to be lowered on a rope. It is probably more likely that the two passages referred to are portions of the Descending Passage, the one leading to the right heading more or less in the direction of the Pyramid of Chephren (but as we now know, actually leading to the Subterranean Chamber and its strange small tunnel beyond that appears to come to a dead end) It is difficult to imagine, however, that anyone concluded the turning to the left could possibly be heading toward the Sphinx, as surely it must have been clear that it was merely the Descending Passage leading upward to the northern entrance of the pyramid. The use of a compass to determine direction is even more puzzling. Also puzzling is Bigi's wish to go down farther. What made him think he could do that if he had already reached the Descending Passage, where there is no indication that one can go any farther down? Or by "down" did he mean in the direction of what we now know to be the Subterranean Chamber? Since Bigi descended 70 paces, we must presume that by "pace" he meant the Byzantine pace rather than the larger and far earlier Roman pace, and as the Byzantine pace was equal to two and a half feet, this means that he had descended down the well shaft by 175 feet. However, the well shaft is 200 feet long at least. If Bigi really meant 70 feet, then that is the distance to the grotto. At the distance of 170 feet, the well shaft turns farther south before leading the remaining 30 feet down to the intersection with the Descending Passage. Could Bigi possibly be referring to this juncture, which is nearly 70 Byzantine paces down, at which an iron pin also occurs in the rock? Is it possible that at this juncture Bigi discovered an entrance to another passage that has not been noticed since that time because of a stone covering it? In *Egyptian Dawn* I publish a diagram showing the geometrical importance of the point of this juncture to the larger interior design plan of the pyramid, which suggests that it was not at all an arbitrary point, so a concealed passage entrance at that point is by no means inconceivable. I have never been able to gain access to the well shaft to carry out my own close inspections of the kind I would like.]

MICHAEL HEBERER VON BRETTE (1585–1586)

Translated from volume 18 of the series *Voyages en Égypte* (1976)

Pages 67–68

Not far from the pyramids, one sees a figure called Andro-Sphinx, which the Egyptians made to honor two celestial [zodiacal] signs [Virgo and Leo] which each year brought them all the riches of the Nile. [This refers to the time of the annual inundation and its depositing of the silt.] They made it according to their custom, indicating their beliefs by signs, portraying a Virgin in front and a lion at the rear. From this, one can understand that their greatest riches and their well-being are visible when the sun is in the two signs, that is to say, in the months of July and August, those months [in] which the Nile rises to its maximum, distributing the water over the surrounding land. That is what they wanted to show by these signs and representations

SEIGNEUR DE VILLAMONT (1590)

Translated from volume 3 of the series *Voyages en Égypte* (1971)

Page 198

[Heading of chapter 13] Full descriptions of the admirable pyramids of Egypt, of the Great Colossus or Idol [the Sphinx], and of the mummies that are in the sandy desert . . .

A little distance from the Great Pyramid, and almost adjoining the Nile, is a colossus or head of an idol of a most admirable size: the Campidogle of Rome is nothing compared to it in size. This head is raised on a column [he is referring to the Sphinx's neck; the paws and so forth were then covered in sand] made of a single piece of marble [i.e., limestone], it is of a height of 92 feet, not including the column [neck] which supports it, and the thickness [*grosseur*] is 60 feet. Pliny gave it the credit of calling it the Sphinx, and said that its face extended 200 feet in width, and the length of its head is 423, which it is not; anyway, it is certainly a head of marvelous size and worthy of being given a marvelous number. It is said that in ancient times it was an oracle that gave responses to the Egyptians for the questions that they asked of it at sunrise.

CHRISTOPHE HARANT OF POLZIC AND BEZDRUZIC (1598)

Translated from volume 5 of the series *Voyages en Égypte* (1972)

## The Sphinx

Another thing worthy of admiration and which one finds in these parts is a head whose face resembles a human being and who rests on his neck, facing Cairo. The nose, the eyes, the mouth, the forehead, the cheeks, the ears, and the other elements of the head are cut by the hand of a master, and it is astonishing that all this has remained intact for such a long time. Pliny describes this head in these measurements 144 feet [*soulier*, a “shoed foot,” slightly larger than a foot (*pied*)] in height, the circumference from the level of the brow and whiskers at the front to the rear is 102 feet. All this is nothing but a single block of marble. It is not only the cutting, but also the transportation of such a stone, that command the admiration of all spectators.

Monsieur de Villamont in book 3 has written that the head is 92 feet high.

According to Pliny, this head had been the tomb of King Amasis, whose body was found in the interior. . . . Others say that this head was an image of the divinity of the Egyptians in the past and that Satan responded [as an oracle] to questions asked at sunrise or sunset. Blaise de Vinegère, in his *Les Images de Plattepeint de Philostrate* [*The Images of Philostratus*], says the same thing on that subject, and he adds that those who clamber to the top of the head are struck by misfortune; he cites the example of a Frenchman who, having done this, and led on by curiosity, clambered to the top of the head, and on his return journey to Cairo was thrown to the ground by his horse and killed.

AQUILANTE ROCCHETTA (1599)

Translated from volume 11 of the series *Voyages en Égypte* (1974)

(12) At the distance of an arquebus [an old-fashioned rifle] shot from the pyramids, one finds half of a marble statue that, I was told, was made as a certain idol where the pharaohs consulted the oracles, it is a marvelous thing. I did not measure the figure; it is 21 palms [*palmes*] in length. But I quickly left that place for fear of Arab thieves.

**Prodigious Colossus**

I saw a half-figure of a statue, consisting of nothing but a head and shoulders, so excessively and prodigiously large that I could not imagine by whom it was constructed, there being so little means of transporting it in this sandy place. For its shoulders are of such size that according to my measurement they extend up to 80 spans [*brasses*], and from them to the summit of the head, I would say 20 spans. I leave it to those who have never seen the Colossus of Rhodes whether it could have had any greater bulk. This head is all damaged as a result of its antiquity, rather than by this nation's neglect.

GEORGE SANDYS (1611)

George Sandys, *A Relation of a Journey Begun An. Dom. 1610*, London, 1615, pages 102–103; reprinted later in Samuel Purchas, *Purchas His Pilgrimes* (London 1625)

Part 2, page 896: “. . . the Journey of George Sandys in 1610 to the Middle East, including Egypt”

**The Colossus**

Not far off from these the Colossus doth stand, unto the mouth consisting of the natural Rock as if for such a purpose advanced [provided] by Nature: the rest of huge flat stones laid thereon, wrought all together into the form of an Aethiopian woman and adored heretofore by the countrey people as a rural Deity. Under this, they say, lyeth buried the body of Amasis [Amasis was a pharaoh of the Twenty-sixth Dynasty, 570–526 BC.] Of shape, lesse monstrous than is Plinies report: who affirmeth, the head to be an hundred and two feet in compass, when the whole is but sixty feet high. The face is something disfigured by time, or by indignation of the Moors, detesting images. The aforesaid Author (together with others) do call it a Sphinx. The upper part of a Sphinx resembled a maide, and the lower a Lion; whereby the Egyptians defigured [represented] the increase of the River, (and consequently of their riches) then rising when the Sun is in Leo and Virgo. This but from the shoulders upward surmounteth the ground [i.e., all that could be seen above ground level at this time was from the shoulders upward], though Pliny give it a belly which I know not how to reconcile unto the truth, unlesse the sand doe cover the remainder. By a Sphinx the Egyptians in their hieroglyphicks [re]presented an Harlot, having an amiable and alluring face, but withal the tyranny, and rapacity of a Lion: exercised over the poor heart-broken, and voluntarily perishing Lover.

The images of these they also erected before the entrances of their Temples; declaring that secrets of Philosophy, and sacred Mysterie, should be [en]folded in Aenigmaticall expressions, separated from the understanding of the prophane multitude

WILLIAM LITHGOW (1612)

*A Most Delectable and True Discourse of an Admired And Painefull Peregrination from Scotland to the Most Famous Kingdomes in Europe, Asia, and Affricke*, 1623 edition (London: 1614)

Betweene the biggest Pyramide, and Nylus [the River Nile], I saw a Colosse, or head of an Idoll, of a wonderful greatnesse; being all of one marble stone, erected on a round rocke: It is of height (not reckoning the Columnne) above 815 [this is a typographical error] foote, and of circuite, 68 Pliny gave it the name Sphingo, and reported much more of the bignesse, largenesse, and length of it. but howsoever he erred in his description, yet I resolve my selfe, it is of so great a quantity, that the like thereof (being one intire [sic] piece) the world affordeth not [i.e., the like is not to be found elsewhere in the world], and may be reckoned amongst the rarest wonders: Some say, that anciently it was an Oracle, the which so soone as the Sunne arose, would give an answere to the Egyptians, of any thing by them demaunded [i.e., any question they asked].

[Note The misprint giving 815 feet for the height also appears in the 1614 edition and the modern reprint of 1971. Probably the last digit is accurate, and the 81 was meant to be either a 3 or a 2, giving a height of either 25 feet or 35 feet. By "the column," Lithgow presumably refers to the base of the neck, just visible above the sand, which some people assumed was a column upon which the head rested.]

#### PIETRO DELLA VALLE (1614)

*Les Fameux Voyages de Pietro della Valle*, French translation of *Viaggi di Pietro della Valle* (Paris: 1664), 4 vols.

Vol. 1, page 228

. . . and there nearby I admired a huge head which they call the Sphinx, which is certainly a beautiful piece of stone in the shape that we represent. [Presumably, he refers to an engraving that is not in the French edition.] I cannot remember very well having seen if this rock is natural, from the area, or whether it has been carried there, but the latter is more likely because the country around there is very level and sandy, and the sand has increased in such a way that the Sphinx is buried there almost up to its shoulders. If it were carried there, the work involved would have been much more considerable than that of the obelisks, because it is so very big, although from its shape and situation, it would undoubtedly have been easier to convey such a thing than to construct the pyramids. At least one does not believe so much of them to be broken [as of the Sphinx]. I was not able to satisfy my curiosity further, because night surprised me, so much so that to get back to the little hamlet several miles away where I wanted to see some other pyramids [at Abusir], I was obliged to walk two or three hours in the dark.

#### VINCENT STOCHOVE AND GILLES FERMANEL (1631, JOINT ACCOUNT)

Translated from volume 15 of the series *Voyages en Égypte* (1975)

Pages 80–81

About four hundred steps from here we saw a great colossus called Sphinx; the ancient Egyptians called it the epitome of marvels. It was their principal idol, that which rendered their oracles by means of the devil. Its form is half woman and half bull. The head, with the front of the body, remains still outside the sand, but the rest of it is all covered up. The head, which has the face of a woman, is of two pikestaffs in height, and the rest of the body emerging is entirely cut from one single stone:



from it one can judge of its immense size.

ROBERT FAUVEL (1631)

Translated from volume 15 of the series *Voyages en Égypte* (1975)

Footnote on page 81 (MS De Rouen, page 439) [The reference to page 439 is to a page in the manuscript at Rouen. Page 81 is the page in the published book.]

It [the Sphinx] is all made from one piece of stone, hollow inside, having the head of a woman and the rest of the body like that of a cow. One only sees the head and some part of the body; the rest remains hidden under the sand.

HENRY BLUNT (1634 AD)

Translated from volume 13 of the series *Voyages en Égypte* (1974)

Page 44

### **The Sphinx of Giza**

Within two bowshots from there is a rock, about 40 yards in perimeter and about 12 or 14 in height, cut in the form of the head of a man, perhaps that of Memnon, [which is] celebrated for the sound that it emitted at sunrise. [He refers here to the Colossus of Memnon near Thebes, which was noted for this sound, and is not suggesting that the Sphinx did this.] The Egyptians and the Jews who were with us [on this trip] told us that in olden times it had once rendered oracles, and also that it was hollow on top. They had seen several people go in there and come out again at the Pyramid. I immediately thought then of the story of the oracle, and I thought that all the other manifestations had the same cause, rather than the effect of the mist [he is referring to the morning mists, suggested as the cause of the sounds emitted by the Colossus of Memnon at Thebes, and assuming that one explanation for the oracles spoken by the Sphinx might be the same, but he then rejects this in favor of men hiding inside], although this would not be impossible, or even being of demoniacal origin, which would suppose too great a credulity.

[Later it was discovered that the original English text was cataloged in the British Library under the spelling “Blount” rather than “Blunt.” Although the British Library does not have the original book *A Voyage into the Levant*, published in London in 1636, there is a modern facsimile reprint of it (Amsterdam and Norwood, New Jersey, 1977). The following is the original English text taken from page 47.]

. . . within two Bowes shoot hereof [from the Great Pyramid], is a Rocke of some fortie yards circumference, and twelve or fourteene high, cut into the forme of a mans head; perhaps Memmons, famous for its sounding at the Sunrise, the Egyptians, and Jewes with us, told us it gave Oracles of old, and also that it was hollow at the top, wherein they had seene some enter, and come out at the Pyramide: then I soone believed the Oracle, and esteeme all the rest to have beene such, rather than either by vapor, though not impossible, or Demoniacke, which require too much credulitie, for me.

GEORG CHRISTOFF VON NEITZSCHITZ (1636)

Translated from volume 13 of the series *Voyages en Égypte* (1974)



### **On My Return Journey to Babylon [Cairo] and of an Oracle Encountered Enroute**

After we had sufficiently examined the pyramids, we continued on our return journey to Babylon. But not far from here we came upon a rock of an extraordinary size, and formed by nature like the head of a man with huge ears, eyes, hair, and a long neck.

In this huge head would have lived, not many years before, an oracle, or divine diabolical spirit, who would reside apparently inside the pyramid described above, in a deep and dark hole through which one would have to pass with much care during the ascent and descent. Then it would return underground into that head, from where would be given counsel and instructions to the pagans on the subjects of which they had enquired. If the divine spirit had the same shape as presented by the head, it would not be astonishing that one would flee from it to a place assigned by it to knowledge and truth. Which is why one cannot ever be too amazed at the complete blindness of some poor people and should thank God for being free and illuminated by the knowledge of the sole true God, a knowledge which procures eternal salvation.

JOHN GREAVES (1637)

*Pyramidographia. or, A Description of the Pyramids in Aegypt* (London: 1646)

Taken from A. and J. Churchill, *A Collection of Voyages and Travels, etc.* (London: 1732), 4 vols.

Vol. II, page 662

On the east-side of this room [the Queen's Chamber of the Great Pyramid], in the middle of it, there seems to have been a passage leading to some other place. Whether this way the priests went into the hollow of that huge sphinx, as Strabo and Pliny [book 36, chapter 12] term it, or androsphinx, as Herodotus calls such kinds, (being by Pliny's calculation 12 feet in compass about the head, in height 62, in length 143 And by my observation made of one intire [sic] stone) which stands not far distant without the Pyramid, southeast of it, or into any other private retirement, I cannot determine; and it may be too this served for no such purpose . . .

JEAN COPPIN (1638–1639 AND 1643–1646)

Translated from volume 4 of the series *Voyages en Égypte* (1971)

Page 186

The Sphinx, or the head that I come to speak of, served as an oracle at Memphis before the coming of Christ, in that the demons spoke effectively from there where the priests went to place themselves in the statue by an underground vault, which it is said leads from the Great Pyramid down to the Colossus. Even though the Egyptians were blinded [misled] by the mistaken [oracular] responses that they received there, they were happy to be buried nearby, and that is the reason why one sees such a large number of sepulchres in that area. What is more surprising is that one is assured that it is bad luck to climb on top of the head, so that all those who out of curiosity climb up onto it soon suffer a great misfortune, even on the same day. I have always taken this sort of thing as a fable, but someone has confirmed to me a recent example of an Italian who soon after he came down from there was

killed by his horse. If this opinion be true, it is a great advantage for many people who have difficulty finding their way down from the top of this figure. I don't know if this proves that there is a bad spirit, but nobody can look at it without wanting to climb it.

GABRIEL BRÉMOND (1643–1645)

Translated from volume 12 of the series *Voyages en Égypte* (1974)

Page 99

### **(12) Concerning the Idol of the Sphinx, or Head**

This head, or Sphinx as one calls it, is a very beautiful piece of hard stone, well carved; and even though more than half of it is under the sand so that one cannot give a true opinion of the whole of it, it is well proportioned and a very fine work. From close up it looks like a great mass. One believes it to have been carried from a long way off, to be treasured all the more for the difficulty involved. It is hollow inside, and this was how [oracular] responses were uttered by a man hiding within. Only the head, neck, and a little bit of shoulders appear above the sand. The figure represents a young adolescent or a woman.

BALTHAZAR DE MONCONYS (1646–1647)

Translated from volume 8 of the series *Voyages en Égypte* (1973)

Page 63

. . . after that [seeing the second pyramid] we came to the foot of the Idol [the Sphinx], which is 26 feet high and has hair to its chin, which is a part extending 15 feet from the head; from there we went on to the mummies [at Saqqara] . . .

JEAN DE THÉVENOT (1655)

*The Travels of Monsieur de Thevenot into the Levant* (London: 1687), 3 vols. in one.

(Translation of *Relation d'un Voyage Fait au Levant*, 3 vols., Paris, 1664–84.)

Vol. I, pages 134–35

Before each of the three Pyramides, the marks [*should be translated* “remains”] of certain square Buildings are still to be seen, which seem to have been so many Temples; and there is a hole at the end of the pretended Temple of the second Pyramide [which is now called the Valley Temple], by which (some think) there was a way down within the Temple to go to [*should be translated* “by which one went down from inside the Temple to go into”] the Idol [the Sphinx], which is a few steps distant from that hole.<sup>\*1</sup> The Arabs call this Idol *Abou el haoun*, that is to say, Father of the Pillar, which Pliny calls Sphynx, saying that the People of the Countrey believe King Amasis was buried in it. I am sure they believe no such thing at present, nor so much as know the name of Amasis, and indeed, it is an erroneous belief. Others say, that a King of Aegypt caused this Figure to be made in memory of a certain Rhodope, a Corinthian Woman, with whom he was much in love. It is said, that this Sphynx, so soon as the Sun was up, gave responses to anything it was consulted about; and hence it is that all who go into the Pyramides, fail not to say, that a Priest conveyed himself into that Idol, by

the Pit or Well [the so-called well shaft] in the Pyramide which we just now described. But to shew how groundless an Opinion that is, we must know how the Idol is made: It is the Bust of a Body, at some steps distance from the open Pyramide [the Great Pyramid was the only one open at that time], cut out of the natural Rock, from which it hath never been separated, though it seem to be of five Stones pieced together one upon another; but, having very attentively considered it, we observed, that that which at first seemed to be seams or joynings [joinings] of the Stones, are only veins in the Rock: this Bust represents the face and breast of a Woman, but it is prodigiously high, being twenty six foot in height, fifteen foot from the ear to the chin, and yet all the proportions [are] exactly observed: Now what probability is there to believe, that every day a man would take the paines, and venture the breaking of his neck, by descending into that Pit, that being at the bottom, he might only have the labour of coming up again, for there is no passage there, as they who have gone down have observed; a passage must have been cut in the Rock then, which would have cost a great deal of Money, and been known of [by] every Body It were more probable [would be more likely] to think that they entered it by the Hole, which (as I said) is in the pretended Temple of the second Pyramide, or rather by another [hole], which is at the side of that Idol and very near it [i.e., near the head, most of the body being covered by sand]. These two Holes are very narrow, and almost choaked [choked] up with Sand, wherefore we entred not into them, not knowing besides, but that we might meet with Vipers, or other Venemous Beasts in them. But though there had been a way through the Rocks into that Idol, how could the Voice of that feigned Oracle have come out, since there is no hole neither at the Mouth, Nose, Eyes, nor Ears of it?<sup>\*2</sup> It may be said, perhaps, that the Voice was uttered by the Crown of the Head, where there is a Hole, into which we endeavoured to have cast some Hooks fastened to Ropes, that I had brought purposely with me, that we might get up, but we cold not compass [achieve] that, because of the height of it; only when we threw up Stones, they rested there. And a Venetian assured me, that he and some others, having got up by means of little Hooks and a Pole, which they brought with them, they found a Hole in the Crown of the Head of it, and having entered therein perceived that it drew narrower and narrower proportionably, as it approached the Breast where it ended. The voice of him that entred then, by the abovementioned Holes, did not come out that way, and therefore it must be concluded, that if any entred it, it must have been by a Ladder in the Nighttime, and that he put himself into the hole that is in the Head, out of which the Voice came

EDWARD MELTON (1661)

*Eduward Meltons Eengelsch Edelmans, zeldzaame en Gedenkwardige Zee- en Land-Reizen; door Egypten . . .* (Amsterdam: 1681 and 1702)

Page 51

[Note: This work and author are in all probability spurious. The account of the Sphinx is plagiarized from those of Johann Wansleben and Jean de Thevenot. It is doubtful if any Edward Melton ever existed; although he is described as “an English nobleman,” no Edward Melton ever published a word in English, and the name is probably invented. I consulted a seventeenth-century manuscript pedigree of the Melton family in the British Library (MS Egerton 3402, f. 119 verso), and there is no Edward mentioned anywhere in it.]

### Description of the Sphinx

We decided to see the Sphinx, which is located to the east of the Pyramids. It has the head and half of the breast of a woman and is of an impressive size. It is 26 feet tall and fifteen feet from chin to ear.

Pliny tells us that the Sphinx is the location of the grave of King Amasis. I like to believe it is a grave, but I am not sure whether it is the grave of King Amasis. It is hard to say, since the original texts are lost.

Some say that the Sphinx is made to look like a certain courtesan named Rhodope. She was considered the prettiest woman of Thrace in her time and admired by the king who is buried in this grave

We can speak of a grave for certain since the Sphinx is located at a place that used to be a burial ground. Second, it stands close to the Pyramids and the caves, which are nothing but grave-cities. Besides this, it's obvious from the shape that the Sphinx contains a basement as wide as the height of the Sphinx. It also has an entrance. This basement was without doubt used to bury the bodies of dead men.

By the use of a rope ladder that we brought, we climbed all the way up to the head of the Sphinx to see if it was hollow. It was, but it was filled with sand so we could not tell the size of the space inside. We also found that the neck was badly damaged. It looked like the seams couldn't carry the head much longer.

When one looks at this miracle from a little distance, it seems to be made out of five stones. But when you come closer, you find that the lines you first thought were seams turn out to be the veins in the stone.

PÈRE ANTONIUS GONZALES (1665–1666)

Translated from volume 19 of the series *Voyages en Égypte* (2 parts, 1977)

Part 1, pages 144–46

Chapter 14

### **Description of the Sphinx Idol, of Mummies and of Embalmed Cadavers**

Tacitus [*Annals*, 50, 2, chapter 61] wrote that Germanicus saw near the pyramids a stone statue of Memnon, which emitted sound when the rays of the sun touched it or illuminated it [at dawn; this is a confusion, for the famous statue in question, known as the Colossus of Memnon, is near Thebes, not at Giza]. But I have the impression that this statue is that of an old idol, which is one called Sphinx, and which was situated not far from the pyramids, about a quarter of an hour. There today arises a large head or monster, astonishing in its shape and grandeur. On the subject of this monster, Pliny wrote the following (book 36, chapter 12): “In front of the pyramids is found a Sphinx, very admirable indeed, apparently a sylvan god of the locals. It is thought that King Amasis is interred there. The common opinion holds that he was placed there. It is polished, cut from natural rock. The head of this monster has a circumference of 102 feet and a length of 143 feet.” I do not wish to judge the height and size of this head, because we had no instruments for measuring them at the time. I only know that the head of this monster is enormous, and that it is called even up until today the idol Sphinx.

Formerly it was the most important idol of the Egyptians, which foretold to them many things that the Devil knew. They took its counsel, and she revealed to them numerous things that took place

The upper part resembles a man, the lower part is like a bull, one is told by the people of the vicinity. The upper part remains above the sand; the lower part, on the contrary, is entirely covered. If it be true that the rest, or the lower part, is proportionate in size to the upper part, one must consider



that it is one of the Seven Wonders of the World, for it seems to be cut from one piece of stone. Some people ask themselves if this stone colossus was cut from a natural rock in situ, or if it had been carried from elsewhere. Plenty of people have wanted to examine it by excavation but they could not because of the sand. Others thought that this monster consisted of nothing more than half a body, for under the neck there is an opening of a stone tunnel which passes across the mountain of sand up to the pyramids, where it ends. Radzivil [Prince Mikolaj Krzysztof Radziwill Sierotka (1549–1616)] (1583 AD) believes equally in oracles coming out of the mouth of the Sphinx. [Radziwill's account of his journey to the Middle East in 1582–1584 was originally published in Polish as *Peregrynacia . . .*, unknown date, and then translated first into Latin by Thomas Traterus as *Hierosolymitana peregrinatio . . .*, Brunsberg, Germany, 1601, and later into German by Lorenz von Borkau as *Jungst Geschehene Hierosolymitanische Reyse*, and published in S. Feyerabend's anthology *Reyssbuch dess Heyligen Lands*, 1609. Unfortunately, this information came to light just as this book was going to press, too late for me to consult the German version in the British Library and translate Radziwill's account of the Sphinx into English for inclusion in this book.] For this reason, there are some people who suppose that the priests of this idol went by way of this tunnel into the head. Fuerer (1565 AD) thinks that there is a special channel. [This reference is to Christopher Fuerer von Haimendorff, *Itinerarium Aegypti . . .* (Nuremberg, 1620), also published in German in 1646; 1565 is the date of his journey to Egypt, not the date of publication.] As I said in the preceding chapter, inside the Great Pyramid is a well that seems to open into a tunnel leading toward this head.

But for myself, I believe furthermore that the Devil spoke and replied through this head to fool the poor idolators. For the people told us that if someone had lost a camel, an ox, or a donkey, he would go and burn a little incense in front of this idol, he asked counsel, and after its response he found these missing animals. The Devil knows a lot more than man. *A fortiori*, I have not discovered any openings in the mouth of this head, or any other openings by which the priests could have spoken.

About a hundred paces from there are numerous brick and mortar ruins and extraordinary little hollow chambers in the rock, with some figures and writing in Arabic or Hebrew characters. Some people think that the priests of the idol Sphinx once lived there. Others believe that they were hollowed out by the kings of Egypt and other princes related to them, during the construction of the pyramids, as shelters protected from the sun where they could watch the workmen.

Page 142

Near this chamber [the King's Chamber] another passage opens in the direction eastward, which ends in a second small chamber [this refers to the Queen's Chamber and the passage running southward to it from the bottom of the Grand Gallery] and has a well quite near [the entrance to the well shaft in front of the passage to the Queen's Chamber], wide and deep, with a kind of stairs. One of our soldiers went down there and found a new passage or way, which it seemed to him went down towards the idol Sphinx of which we will speak in the next chapter. As no one had the desire to follow this soldier, and also because our time was running out, he left the well and we departed from the Pyramid together. On leaving, I noticed some passages to the left, but each time one goes there, one always looks at the main things and still has to hurry away.

CORNEILLE LEBRUN (1674)

Cornelis de Bruyn, *Voyage au Levant* (Paris: 1725)

Some distance from the largest pyramid on the east side, one sees the Sphinx, famous with the ancients. It is a statue that has been cut from the same rock, representing a woman's head with half of the chest; but just now it is buried up to the neck in sand. On the right hand, the sand is higher than elsewhere to quite a large extent; in a manner that could easily lead one to believe that under this elevation is hidden the rest of the body, which resembles a lion, with its face turned to the right. It is an extraordinarily large mass, but where the proportions can still be seen, even the head alone is 26 feet high, and from the ear to the chin is 14, according to the measurements taken by Monsieur Thévenot. From a distance it seems to be five stones joined together; but when you get closer, you see that what you had taken to be joints of stones are in fact veins in the rock. Pliny states that this colossus was the tomb of the King Amasis, which is not so unbelievable, since it is in a place which was formerly, as we have said, a type of cemetery, and close to the pyramids and the caves that were for that same purpose; but to know whether it was specifically that of King Amasis, is something I cannot assure you of because there is no way it can be proved for certain, all memoirs of that antiquity being lost.

Other people wanted to believe that an Egyptian king had this sphinx built in memory of a certain Rhodope of Corinth with whom he was passionately enamored. Writers have written much about this sphinx. They say, among other things, that she rendered oracles, which was undoubtedly the result of trickery by the priests, who practiced it in nearby subterranean passages. Some people believe that the well that is in the great pyramid could have been used for this. Although one no longer finds any passageway today, perhaps this is because it has been blocked by the caving-in of the earth. Thus one can offer no assurance on this matter. What is certain is that there is no opening there, neither from the mouth, nose, eyes, nor ears; and if the priests had placed here some method of deceit, it would have to have been by means of a hole, with someone climbing up a ladder to the top of the head and descending into the chest, where it [the hole] would end. The Consul, with most of our company, rested in the shade of this great mass while I was occupied with drawing the pyramids, which are nearby. One could easily, upon inspection of the figure, judge the grandeur of this monstrous statue by the proportion one observes between it and people standing roundabout. As for the particular details of the Sphinx in general, I am happy to refer to what Dr. O. [Olfert] Dapper has written of it, and which he had himself borrowed from others. [Much of what is said above is quoted or paraphrased from Thévenot. As for Dapper's book, it appeared under three different titles, twice in 1681 and once in 1688, all published at Nuremberg, but I have been unable to consult it so Dapper's account is missing here.]

He says that when the Egyptians deal with nature, they represent the sphinx in two ways; namely, in the figure of a crouching lion on its belly, or in the form of a type of monster that has the body of a lion and the face of a girl. By the first figure they represent Momphta [presumably he refers to the deity called Hapi], who was one of the Egyptian divinities who lived in all the waters, and who particularly maintained and preserved the causes of the inundation of the Nile; and by the second they represent the same increase of this river. . . [Much of the omitted text deals with mythology and the overflowing of the Nile, and so forth] . . . They [the Greek authors of fables and mythological tales] had said according to the evidence of Hyginus and some others that the [Greek] Sphinx was a monster born from Typhon and Echidna, that it had the head and the face of a girl, the wings of a bird, and the body of a dog. Or, as Clearchus said of it, the head and hands of a girl, the body of a dog, the tail of a

dragon, the claws of a lion, the wings of an eagle. It was, they say, in Boetia on the Mountain Sphincius near Thebes, from where it had the custom to throw passersby from the cliff and propose to them a riddle to which they would have to give the answer. . . .

ELLIS VERYARD (1678)

Translated from volume 23 of the series *Voyages en Égypte* (1981)

Pages 47–48

### **The Sphinx**

Approximately a half mile from the pyramids, we saw an ancient colossus representing the Sphinx, with a face of a woman and a body of an animal. This statue was apparently held in such great veneration by the Egyptians that they gave it first place among their gods. They received from it all their oracles, which the devil pronounced from the mouth of this artificial monster. The body is buried in sand and only the breast and the head are above the ground. Thus one can judge the enormous size of the whole thing from the face, which is 24 feet long. Pliny says that it was the tomb of the King Amasis, but I tend to believe that it was an ornament placed on his sepulchre, for in the rear one finds a subterranean vault hollowed out of the hard rock, which in all likelihood was the tomb.

ELLIS VERYARD (1678, THE ORIGINAL ENGLISH TEXT)

*An Account of Divers Choice Remarks . . .*

*Taken In a Journey through Egypt . . . etc.* (London: 1701)

Page 298

About half a Mile from the Pyramids we saw an ancient Colossus representing the Sphinx, with a Woman's face, and the Body of a Beast. This Statue was in so great Veneration amongst the Egyptians heretofore, that they gave it the first place amongst their Gods, and received all their Oracles from it, which the Devil utter'd thro' the Mouth of this artificial Monster. The Body is buried in the Sand, and only the Head and Breast remain above Ground; so that we may judge of the vast bulk of the whole by the Face, which is twenty four foot long. Pliny says it was the Tomb of King Amasis; but I am apt to think it was an Ornament placed on his Sepulchre; for behind it we found a Subterranean Vault cut out in the firm Rock, which in all likelihood was the Tomb.

BENOIT DE MAILLET (1692)

*Description de l'Égypte* (Paris: 1735)

Pages 221–23

### **Concerning the Sphinx**

Opposite the second pyramid, and exactly to the east is this famous sphinx, of which so many accounts have spoken. It is at least 300 paces away from the pyramid, and from there one can count 200 paces from it up to the spot where the Nile laps at the pyramid plateau. It is a woman's head grafted onto the body of a lion crouching on its belly. This head would probably still be entire if the Mohamedans had not disfigured it. Someone has broken off the nose. The body has been damaged by the passing of

years, one sees today only the shape of it, the lower part being buried under the sand. It is a stupendous head, more than 35 paces in circumference on a body that is more than 30 paces long. As several authors have spoken of this colossus, I will content myself with adding to what they have said about it, that although the head has a hole which has been hollowed from above, there is nevertheless, from this void, no connection with the mouth, nor is there any other place on the inside of the figure through which one would have been able to speak, as some people have claimed. I will add that this hole has very little depth and that far from being a communication to the interior of the first pyramid, as some people have falsely imagined, it would be much more natural to believe, if it were true that this artificial tunnel actually exists, that it would lead to the inside of the second pyramid, to which it corresponds so perfectly in its position.

This idol could have had several intended purposes. Perhaps it was not maintained for any specific use, but rather to be admired for its astonishing size. It could have been made from a mountain of stones that were smoothed as proof of those who had removed it, in the same way that today one leaves signs on ground that one has made level. One could even have used it as an auspicious arrangement of the locality, by cutting a figure in the rock which surprises succeeding generations.

Some people say that it was a talisman, others that it was an idol that was adored. What is most likely is that this union of the head of a girl with a body of a lion, so common and ordinary and which we see represented so frequently in Egypt, was a symbol of what happened in that country under the signs of Virgo and Leo. It is in effect in that season, when the sun traverses them, that the Nile overflows and makes Egypt fertile and habitable with its inundation. The kings of Egypt did not believe they could bear better witness to the sun than in their recognition of it as the author of their happiness by consecrating this mysterious figure to him.

Several people have claimed that the sphinx of the pyramids, or at least the head of that prodigious colossus, was composed of several stones placed and well cemented one on the other. What made it possible to have this idea was that in three or four places around this mass one notices, in effect, veins that circle around the head in an almost horizontal way and that these veins seem to contain a kind of mastic of a different color than the stone. For my part, having looked closely at these veins, I am of the persuasion that they are natural to the stone. When one cannot be convinced of it by investigation, when in several places there is no slanting [he is referring to the fact that the rock layers are all tilted and slant slightly at the Sphinx], it would be enough, to ease one's doubt, to take a look at some of the small pyramids not far from this figure that are placed on the level stretch of the same rock. There, one discovers similar veins, which prove manifestly that those observed in the head of the sphinx, like these, are made of nothing more than little bits of stone that are a characteristic of this terrain. I believe that this figure was formerly covered by a temple. The proof I have of this is that the head of the figure is still, today, complete in all parts, where it has not had violence done to it by the hand of man rather than under the chisel. The reddish paint with which it was covered is still there. One notices elsewhere around the colossus a kind of circuit, where the sand under which it is buried stays higher than the rest of it; and I have no doubt that it hides the foundations and the debris of this edifice, which served as the temple to the idol.

On going again from the sphinx back toward the second of the great pyramids, to the front of which, and precisely in the middle, the colossus was placed on the east side, one discovers about 4 paces from the pyramid the remains of another temple, which is almost opposite it [He is referring to the Funerary Temple of Chephren.] I was surprised that no other traveler that I know of has spoken of this monument, of which for several thousands of years, the intended purpose would not still be in doubt.



One finds a similar temple [the Funerary Temple of Mycerinus] opposite the third pyramid and at the same distance from it.

This one is more complete than the first. [These are the funerary temples of Chephren and Mycerinus, which stood at the feet of these two pyramids ]

GIOVANNI FRANCESCO GEMELLI-CARERI (1693)

*A Voyage Round the World*

Translated from the Italian; the voyage commenced June 1693

Taken from A. and J. Churchill, eds., *A Collection of Voyages and Travels*  
(London: 1732), 4 vols., folio

Vol. IV, page 23

[Referring to the “well shaft” in the Great Pyramid]

Between the two ways already mentioned, on the right hand, is a wall, which appears on the ground perpendicularly from the Horizon, making the figure of the Hebrew Lamed [a letter], in which down seventy-seven foot, there is a square window, or inlet to a small cavern cut out of the soft stone that runs westward; the pyramid being built on the hard rock. Down fifteen foot in this cavern, there is an oblique way, cut in the same stone, two foot and four inches in breadth, and two foot and an half in height, descending 123 foot, where it is stopped up with sand and stones. [The sand and stones were finally cleared by Captain Caviglia in 1817.] Those Barbarians say, there was a passage there underground, to the empty head of an idol [the Sphinx], that stood not far from the pyramid. As much of this idol as remains, which is from the shoulders upwards, is twenty six foot in length to the top of the head, and from the ear to the chin fifteen. All this that has been said, will appear the more plainly, by the following cut. [Cut is an old-fashioned term for an engraving, he refers to an accompanying engraving of the Great Pyramid in section, which, however, shows the internal passages incorrectly drawn.]

ROBERT HUNTINGTON (1695)

Apparently never published in English. Translated from volume 23 of the series *Voyages en Égypte*  
(1981)

Page 167

I would consider it an impiety to forget the Sphinx or statue with a human head. Its bulk is enormous, it is 100 feet in circumference at the level of the shoulders.

It is cut from a single stone and faces toward the east.

Page 193

And of this kind of porphyry is the celebrated Sphinx (an enormous head and shoulders, the whole being 110 feet in circumference), still standing near the north pyramid [the Great Pyramid].

[Obviously, the Sphinx is made of limestone, not of porphyry, so Huntington is in error.]

Page xxiv (editor's introduction)

After the visit to the other pyramids, his excursion ended at the Great Sphinx. He was full of admiration. In supplying the exact dimensions of the monument, he declared that he "pitied Pliny for his exaggerations" (page 166). Meanwhile, without hesitation he claimed that the head of the Sphinx was hollow. This proves that he had only seen the fabulous androcephalic monument either superficially or from afar.

[The editors of Morison appear to be unaware that travelers for centuries had been told that the head of the Sphinx was hollow, and Morison's statement certainly does not prove that he had seen the Sphinx only "superficially or from afar." All it proves is that the same tradition was being repeated to him by the local guides as had been told to visitors for centuries.]

Pages 175–76

About two hundred steps from the Great Pyramid on the east side, one sees the head of a sphinx, whose body is buried in the sand. It seems that the neck of this figure may be 15 feet high, and the head, which is still complete, is of such an extraordinary size that it provided enough shade for eleven people—which we were—to protect us from the extreme heat of the sand, from which we were suffering. As its figure is doubtless proportionate, it would have to be more than 100 feet long, and consequently its size is prodigious. [The length of the excavated Sphinx from the paws to the tail is now known to be 57 meters (187 feet), the height 20 meters (66 feet).] Pliny [book 36, chapter 17] speaks of it with such exaggeration that I feel sorry for him, and I would doubt his accuracy in other things, judging by his credulity in this matter. The head of this sphinx is hollow, that is, according to the priests of these nearby ruins and temples of whom I come to speak. Under cover of night, they would hide in this head and stay there to speak on certain appointed days to the people who had assembled there and who listened to the discourses of these impostors as if they were oracles being pronounced by that idol. What I most admired about this monstrous divinity was the vivacity of its coloring and above all the vermillion of its cheeks, which seemed to have been applied only two years ago, even though it must have been there for more than two thousand years.

[He then mentions collecting petrified wood from the desert, and a Lake Karoun at Giza, which is not the same as Lake Karoun in the Fayyum.]

JOANNES AEGIDIUS VAN EGMOND VAN DER NIJENBURG AND JAN HEYMAN (1709)

*Travels through Part of Europe, Asia Minor . . . Egypt . . .*

Translated from the Low Dutch (London. 1759), 2 vols.

Vol. II, page 90

After this survey of the first and largest pyramid, we visited the head of the sphinx, and the second and third pyramids. With regard to the former, it is the bust of a woman, with the nose a little mutilated, and is said to have been formed out of one single rock. But I could find no reason for

calling it a sphinx, nothing but the head and neck being seen, though the height is full thirty-feet. And it is a question, whether there ever was anything more of this image than what is at present visible, though Pliny, and others, mention a body, and give it a really amazing magnitude, making the circumference of it to be one hundred and two feet. Some later writers have also mentioned a subterraneous passage from the largest Pyramid to this head, which they say is hollow; and that the Pagan priests used to deliver their oracles here. But all this is mere conjecture. . . . About a mile from hence stands the second pyramid. This structure, from the pieces which, in several places, still cover it, appears to have been covered with marble; but hitherto the entrance of it has not been discovered. It is, except on the south-side, well preserved, having neither chasms nor fissures; and from its surface being every where smooth and even, there is no possibility of ascending it.

[This astonishing description of the Chephren Pyramid in 1709 suggests that the limestone casing stones had not yet been stripped from it, and that the story believed today that they were all taken away in the thirteenth century to rebuild Cairo after an earthquake is false. The pyramid seems to have been stripped of its casing stones as recently as the first half of the eighteenth century, if we are to believe this account by Egmond. The entirety of the casing stones is also represented as being intact in a woodcut published in 1579, from a drawing done in 1565, in the book by Johann Helffrich (see above for a translation of the section of his text dealing with the Sphinx). This woodcut shows the casing stones of the Pyramid of Mycerinus intact as well, but the Great Pyramid is shown as entirely stripped of them, and with the pyramidion missing at the apex. It seems therefore that it was solely the casing stones of the Great Pyramid that were stripped away in the thirteenth century, and no others.]

THOMAS SHAW (1721)

*Travels, or Observations Relating to Several Parts of Barbary and the Levant* (Oxford: 1738)

Pages 368–69

. . . the catacombs of Sakara [Saqqara], the Sphinx, and the Chambers, that are cut out of the natural rock, on the east and west side of these pyramids, do all of them discover the specific mark and characteristics of the pyramidal stones, and, as far as I could perceive, were not at all to be distinguished from them. The pyramidal stones, therefore, were, in all probability, taken from this neighbourhood; nay perhaps they were those very stones, that had been dug away, to give the Sphinx, and the chambers I have mentioned, their proper views and elevations.

Pages 374–75

### **Of the Sphinx**

Besides what has been already said of the Sphinx, we are to observe, that in July 1721, the sands were so far raised and accumulated about it, that we could only discover the back of it; upon which, over the rump, there was a square hole, about four feet long, and two broad, so closely filled with sand, that we could not lay it open enough to observe, whether it had been originally contrived for the admission of fresh air; or, like the well in the great pyramid, was intended for a stair-case. Upon the head of it there is another hole, of a round figure, which, I was told, for we could not get up to it, is five or six feet deep, and wide enough to receive a well-grown person. The stone, which this part of the head consists of, seems, from the colour, to be adventitious, and different from the rest of the

figure, which is all of the same stone, and hewn out of the natural rock. [This is a very sharp observation, for we now know that the head was carved from a stratum of stronger limestone than the body and is indeed harder and “different,” quite apart from the fact that also it was cut down and recarved by a later pharaoh in his own image.] It must be left to future travellers to find out, whether these holes served only to transmit a succession of fresh air into the body of the sphinx, or whether they might not have had likewise a communication with the great pyramid, either by the well, or by the cavity or nich [niche] in the wall of the lower chamber [the Subterranean Chamber], that lies upon a level with it. Nay, it may some time appear, that there are chambers also in the two other pyramids [we now know this to be true]; and not only so, but that the eminence likewise, upon which they are both erected, is cut out into cryptae [crypts], narrow passages, and labyrinths, which may, all of them, communicate with the chambers of the priests, the artful contrivers of these adyta; where their initiatory, as well as other mysterious rites and ceremonies, were to be carried on with the greater awe and solemnity.

CHARLES THOMPSON (1733)

*Travels through Turkey in Asia, the Holy Land, Egypt, and Other Parts of the World* (London: 1754), 2 vols

Vol. II, pages 143–44

Before I leave this Place [Giza], I must take some Notice of a Colossus, at least the Head of one, which stands about a Quarter of a Mile to the East of the second Pyramid. It is usually call'd a Sphinx, which is a fabulous Monster, having the Head and Breasts of a Woman, the Wings of a Bird, the Claws of a Lion, and the Body like a Dog. This figure, among the Egyptians, was a symbolical Representation of the rising of the Nile in the months of July and August, when the Sun passes through the Signs Leo and Virgo. They likewise made use of it in their Hieroglyphicks to represent a Harlot, intimating the Danger of being captivated by the Charms of a faithless Woman, whom the fond Lover in the End finds as cruel and rapacious as a Lion. Of this Sphinx however, near the Pyramids, there is little to be discern'd but from the Shoulders upwards, being a monstrous Bust of a Woman, all cut out of the solid Rock, and never separated from it; except the upper Part of the Head, which seems to be adventitious [added on]. It is almost thirty Feet high, fifteen feet from the Ear to the Chin, and above thirty feet wide at the lower Part of the Neck or Beginning of the Breast. The sand is so accumulated about it, that one can but just discover the Top of the Back, in which there is a Hole about five Feet long, seventy-five [feet] from the hinder Part of the Neck, and thirty from the Tail. We could not get up to the Top of the Head, but those who have done it report, that there is a round Hole, by which a full-grown Person may descend into it, from whence it is supposed the artful Priests deliver'd their Oracles. Pliny makes mention of this Sphinx, and tells us that it was thought to be the Sepulchre of King Amasis. The Rock is dug away all round the Sphinx to a considerable Distance, and the Stone was undoubtedly employ'd in building the Pyramids, with which some Moderns have supposed it has a subterraneous Communication.

RICHARD POCOCKE (1743)

The Rt. Rev. Richard Pococke, successively bishop of Ossory and of Meath, *A Description of the East and Some Other Countries* (London: 1743–1745), 2 vols, folio

[Note The manuscript of this material is not among the twenty-one volumes of travel diaries of Pococke, which are preserved in the British Library (Add. MSS. 22,978–22,998), probably because the original manuscript went to the publisher and was not returned to Pococke afterward. However, some further remarks about the Sphinx from one of Pococke's letters to his mother are given below.]

From 457 f 8, an edition of 3 vols (vol. II bound in two parts) Vol. I, page 46

Directly in front of the second pyramid, about a quarter of a mile to the east of it, is the famous sphinx H [a reference to his engraving, figure XVI, where the Sphinx is marked H on a plan of the Giza Plateau] about half a quarter of a mile from the water when the Nile overflows, being on much lower ground than the pyramids. Here seems to have been the grand way up to these magnificent structures. . . The rock seems to have been dug away all round the sphinx for a great way, and the stone was doubtless employ'd in building the pyramids, the sphinx being cut out of the solid rock; for what has been taken by some to be the joining of the stone, is only veins in the rock. This extraordinary monument is said to have been the sepulchre of Amasis, tho' I think it is mention'd by none of the antient authors, except Pliny [book 36, chapter 12; Pococke's footnote here states: "My account makes the sphinx one hundred and thirty feet long, that is about seventeen feet more than Pliny. He says it was sixty-three feet high, probably taking in a plinth that might be cut out under it; so that about thirty-six feet must be buried in the sand."] I found by the quadrant that it is about twenty-seven feet high, the neck and head only being above ground; the lower part of the neck, or the beginning of the breast, is thirty-three feet wide, and it is twenty feet from the fore part of the neck to the back, and thence to the hole in the back it is seventy-five feet, the hole being five feet long, from which to the tail, if I mistake not, it is thirty feet; which something exceeds Pliny's account, who says that it is a hundred and thirteen feet long. The sand is risen up in such a manner that the top of the back only is to be seen, some persons have lately got to the top of the head, where they found a hole, which probably served for the arts of the priests in uttering oracles, as that in the back might be to descend to the apartments beneath.

Letter 26 to his mother, dated March 3, 1738 or 1739, from British Library Add MS. 22,998, f 67

I went to the Sphynx the head much worn by time, especially the neck, one just sees the top of the back & either a tail or a thigh in a sitting posture;—the whole by the nicest examination I could make seems to be cut out of the rock;—went into some catacombs & round the second Pyramid. We dined together & returned . . .

CLAUDE LOUIS FOURMONT (1755)

*Description Historique et Geographique des Plaines d'Heliopolis et de Memphis* (Paris 1755)

Pages 255–56

To the east, and more than 300 paces from this pyramid, we visited the Sphinx, whose name among the local people is Abou-Ehoul, which is to say, Powerful Father. In the front it is a head of a woman, resting upon the body of a lion lying on its belly. Someone has broken off its nose, the body has been damaged by the passing of years. Today, one sees only the shape of it, of which the lower part is buried under the sand. Its head is more than 35 feet high. This Sphinx was a symbol of what happened in Egypt under the signs of Leo and Virgo when the Nile overflowed, rendering Egypt fertile and

habitable by this inundation.

FRIDERIK NORDEN (1757)

*Travels in Egypt and Nubia*, by “Frederick Lewis Norden,” i.e., Friderik Ludvig Norden, Captain of the Danish Navy, trans. from the [Danish] original and enlarged by Dr. Peter Templeman (London: 1757), 2 vols

Vol. 1, page 76

About three hundred paces to the east of the second pyramid, you see the head of the great and famous Sphinx, which I have taken care to delineate. [See plates XLV, XLVI, and XLVII.]

In *Observations on Egypt*, page 46, Doctor [Richard] Pococke observes: “That this Sphynx is cut out of a solid rock. This extraordinary monument is said to have been the sepulchre of AMASIS, though I think it is mentioned by none of the ancient authors, except PLINY, lib. xxxvi, cap. 12. I found by the quadrant that it is about twenty seven feet high, the neck and head only being above ground; the lower part of the neck, or the beginning of the breast is thirty feet wide, and it is twenty feet from the forepart of the neck to the back; and thence to the hole in the back, it is seventy five feet, the hole being five feet long; from which to the tail, if I mistake it not, it is thirty feet; which something exceeds PLINY’s account, who says that it is one hundred and thirteen feet long. The sand is risen up in such a manner, that the top of the back only is seen; some persons have lately got to the top of the head, where they found a hole, which probably served for the arts of the priests in uttering oracles; as that in the back might be to descend to the apartments beneath.”

Monsieur [Benoit de] Maillet is of opinion “That the union of the head of a virgin, with the body of a lion, is a symbol of what happens in this country, when the sun is in the signs of Leo and Virgo, and the Nile overflows.” The wings were probably added to the Sphynx, as emblematical of the *fuga tempo-rum* [time flying].

Vol. 1, page 73 [Important evidence about water reaching the Sphinx in the eighteenth century]

But when the waters have swollen to their highest pitch, you may go by water from Old Cairo quite to the rock, on which the pyramids are built.

Vol. 1, page 80

After having well considered this first pyramid, you take leave of it, and approach the second, which is very soon dispatched, because it has not been opened. You see there the ruins of a temple, that it has on the east side; and, descending insensibly, you arrive at the Sphinx, whose enormous size attracts your admiration, and at the same time you conceive a sort of indignation at those, who have had the brutality to disfigure strangely its nose

Vol. 1, page 92 in his section (pages 84–95) “Remarks upon the Pyramidographia of Mr. John Greaves,” ref. page 119 of Greaves, edited by Birch

[quote from Greaves] “On the east side of this room [the Queen’s Chamber], in the middle of it [the east wall], there seems to have been a passage leading to some other place. Whether this way the priests went into the hollow of the Sphinx.”

This forced and extremely narrow passage subsists still at present, and terminates in a kind of niche. It could never lead to the Sphinx, because it is in the third part of the pyramid, above the horizon.

CARSTEN NIEBUHR (1761)

Captain of Engineers in the Service of the King of Denmark, *Travels through Arabia and Other Countries in the East*, trans. R. Heron (Edinburgh: 1792), 2 vols [The journey commenced January 1761.]

Vol. 1, page 156

The famous Sphinx is sinking still deeper in the sand; and a great part of the body is already buried. It seems to be formed out of the rock upon which the pyramid stands; a circumstance which confirms my conjecture concerning the place from which the stones for building the pyramids were quarried. I found the chin of the Sphinx to measure ten feet six inches in height; and the whole length of the countenance nearly eighteen feet.

CORNELIUS DE PAUW (1774)

*Recherches Philosophiques sur les Égyptiens et les Chinois* (Paris: 1774), 2 vols

Vol. 1, section 4, pages 258–59

Pierius says in the forty-ninth volume of his *Hieroglyphics* that it is very credible that Egyptian sculptors pretended to give to statues a great air of simplicity so as not to draw people into idolatry. Mr Winkelman [Johann Joachim Winckelmann, the famous German art historian] even suspected that there existed in this respect an actual law, which impeded them at all times when it was a question of representing the human figure, meanwhile they were granted liberty without limit with regard to the representation of animals, among which he also counts the Sphinx, all parts of which he scrutinized with much more attention than Belon had done. And one knows that he discovered characteristic marks of both sexes, that is to say those of the lion, and those of the virgin, which were more to the front, toward the chest. This peculiarity, of which no one had been able to guess the reason until now, derived from the mystic doctrine, in which one showed that the divinity is hermaphrodite, letting everyone realize it was self-engendered; and the sphinxes are the emblem of the Divinity, whom the Egyptians never represented in the manner in which Eusebius described a statue of the god Cneph. Also, Mr Jablonski has proved that Eusebius was grossly mistaken in that.

ABBÉ DE BINOS (1777)

*Voyage par l'Italie, en Égypte . . . etc.* (Paris: 1787), 2 vols.

Vol. 2, page 5

[Letter 53, about the Pyramids]

. . . they [tombs] are about 20 paces from one another, and have at their back a sphinx of which the head is raised more than 20 feet above the sand; the rest of the body, which is said to be more than 100 feet long, is buried in the sand

Opposite the second [pyramid], eastward, is the enormous sphinx, the whole body of which, as I have said, is buried in the sand, the top of the back only to be seen, which is above a hundred feet long, and is of a single stone, making part of the rock on which the pyramids rest. Its head rises about seven and twenty feet above the sand. Mahomet has taught the Arabs to hold all images of men or animals in detestation; and they have disfigured the face with their arrows and lances. Pliny pretends the body of Amasis was deposited within this sphinx. Many authors believe the well of the grand pyramid ended here, and that the priests came here, at certain times, to deliver their oracles, but these are mere conjectures. (*Note.* They bring the cavity on the top of the head of the sphinx, through which the priests delivered their oracles, as a proof of this opinion; but this cavity is only five feet deep, and neither communicates with the mouth nor the body of the sphinx.)

M. Paw [Cornelius de Pauw, see extract on page 488] (*Recherches Philosophiques sur les Égyptiens et les Chinois*) says, these sphinxes, the body of which is half a virgin, half lion, are images of the deity, whom they represent as a hermaphrodite; which opinion seems not to me more happy than that concerning the sepulchre of Osiris

[See page 229, where he criticizes the opinion of de Pauw that the Great Pyramid was the Tomb of Osiris and says sarcastically that de Pauw “in his closet sees better than travelers.”]

COLONEL COUTELLE (1798)

“Observations sur les Pyramides de Gyzeh,” in *Description de l’Égypte* (Paris: 1818)

**The Sphinx**

It is in one of the faults of the Libyan hills, in the area which rises toward the west across the plain, that the Sphinx has been carved; its height is about 13 meters [40 feet] above the actual ground, it remains like a witness and like a mass of stone raised up which has been superficially made to decorate this part of the hill. The rump, scarcely perceptible, seems only traced in the earth, with a length of almost 22 meters [72 feet], and the side that we wanted to discover in clearing away the sand that the winds had accumulated up to the level of the hill presented no regular shape to us to a depth of approximately 9 or 10 meters [30 feet]: as to the hole which had been noticed on the [top of the] head, it is not deeper than 2 meters 924 mm [9 feet], of a conical and irregular shape.

VIVANT DENON (1798)

*Voyages dan la Basse et La Haute Égypte Pendant les Campagnes de Bonaparte, en 1798 et 1799* (London: [although in French], 1807), 2 vols.

I didn’t have time to examine the Sphinx, which merits being sketched with more scrupulous care, and which has never been done in this manner. Although its proportions are huge, its contours, which have



been retained, are supple as well as pure. The expression of the face is sweet, gracious, and tranquil, the character of it is African, but the mouth, of which the lips are thick, has a softness of movement, and both have a truly admirable finesse of execution. It gives the impression of flesh and of life. . . . [The rest of the paragraph is purely an artistic description.]

JOSEPH GROBERT (1798)

*Description des Pyramides de Ghize* (Paris: 1801)

Pages 31–34

Now we must leave the place far from the pyramids and go down toward the east. One follows the plateau; one passes in front of the meridional [north] face of [the Pyramid of ] Chephren, and one moves off from it as far as one can to the right. One goes down quite a gentle slope to find the Sphinx, almost entirely covered by sand, and of which the projecting head is concealed from the eye by the unevenness of the ground.

[Count Constantin-François de] Volney, the only author worth quoting when you want to recount a sound idea about this region, has rightly observed that the completely Ethiopian profile of the Sphinx bears witness, in an authentic way, that that nation has given the Egyptians its laws, its morals, and its religion. These last are no more than a colony descended from Sennahar and some vast regions that encompass Nubia; they have deteriorated by mixing with the Arabs. The foreigners who can stand the disgusting sight of the Hokheila [evidently, a slave market] where Negroes are sold, will not find much there to resemble the profile of the Sphinx.

This monstrous statue, truly colossal, has been sculpted from a protruding piece of rock on which it sits. It is from a single piece. The quality of the stone perfectly resembles the rock itself, despite being painted yellow, and the color has been conserved up until our day in the places where it has not been damaged. Paintings found in Upper Egypt attest [to] the talent of the Egyptians in composing colors and the influence of the dryness of the climate in preserving them.

The Sphinx is actually very dilapidated, much more than it was in 1738, when [Friderik] Norden drew it. I uncovered enough of its back to measure it. But there should be a very considerable excavation to uncover it entirely. [This finally happened in 1817.] If one climbs onto the head, one sees a hole that is 15 inches in diameter at its widest point, and about 9 feet in depth. The direction is oblique. One sees that the depth has been diminished by stones, which have been thrown down into it. It would be difficult to determine the use of this cavity, unless one presumes some underground passage which this passage leads to, and that the priests hidden in this place delivered their oracles from it. The Sphinx was definitely an idol, and the tutelary divinity of this cemetery. The placement of the surrounding sand makes one suspect that the plain, which is at the foot of the rock to the south, and which is more elevated than the usual flood level of the river, is equally strewn with tombs. A little to the southwest is a tomb where a Turkish hermit lives, a chapel around which several trees have been planted.

## Section 2

# ACCOUNTS OF THE SPHINX FROM 1800 TO 1837

WILLIAM HAMILTON (1801)

*Remarks on Several Parts of Turkey. Part 1. Aegyptiaca, or, Some Account of the Antient and Modern State of Egypt* (London: 1809)

Pages 323–24

Where the causeway [leading from Cairo to Giza] ended, we crossed a larger and deeper canal, which we could plainly ascertain to be the line of communication still kept up from the Bahır Jousouf [the ancient Bahr Yusuf Canal, which runs west of and parallel to the Nile] along the skirts of the Desert under [at the edge of the plateau of ] the pyramids, to join the canal of Terram, or the Bahhreiré. Herodotus evidently alludes to this navigation, when he says that, during the inundation of the Nile, boats coming from Canopus or Naucratis [cities on the Mediterranean coast] to Memphis [which is beside Giza] skirted along the Desert and the pyramids, in order to avoid the rapid currents of the main stream.

Pages 329–30

A large and strong built causeway [the Causeway of Chephren] has been carried from the entrances of each of these enclosures [the funerary temples in front of the Pyramids of Mycerinus and Chephren] to the celebrated sphinx, whose enigmatical meaning still continues to puzzle the antiquaries of Europe, and who has proved during a long lapse of ages the faithful depository of the mysteries which envelop every object round her. The French excavated the body of the lion; which they found uninjured; but the sands of the Desert very soon rendered their labour vain, and the last time I saw the sphinx, the head and neck alone were visible. These have been evidently painted all over, and many characters are to be traced upon the head-dress; but we could not ascertain whether they were the sacred or popular letters of Egypt [i.e., hieroglyphics or hieratic writing]; some indeed bore a resemblance to the Arabic. It is still a point of dispute among the learned, whether this combination of the human and the lion's form is typical of the rising of the Nile, the summer solstice, or the wisdom and power of the deity. Such a personification of human intelligence and brutal force might be the original of the Greek Minerva; and agreeably to this supposition, the sphinx is a very common ornament of this goddess on her statues and on her medals.

JAMES WILSON (1805)

Vol. 1, pages 93–94

As the sphinx is a monster in shape, so, among the Egyptian ruins, it appears to have been sometimes represented as of a monstrous size. In this situation it appears in the neighbourhood of the largest pyramid of Giza. Conjecture, among its various efforts, has suggested an idea, that secret passages were originally formed between the sphinx and the pyramids, and that the whole of these communicated with secret apartments in the rocks below. But the chambers in the only pyramid which has been examined [the Great Pyramid was then the only one open], are so small in comparison to the mass of the buildings, that there is scarcely room to suppose, that these contrivances had any religious, or highly important, connection with subterranean abodes or apartments in the rock.

[Here he gives a footnote reference to Thomas Shaw's *Travels*, pages 421–22. There is no indication that Wilson ever visited Egypt, and he gives no eyewitness account of the Sphinx.]

EDWARD DANIEL CLARKE (1810 AD)

*Travels in Various Countries of Europe, Asia and Africa* (London: 1810–1823), 3 vols

Vol. 3, part 2 (1814), pages 127–28

### **PART THE SECOND. Greece, Egypt and the Holy Land**

Upon the south-east side is the gigantic statue of the Sphinx, the most colossal piece of sculpture which remains of all the works executed by the Antients. The French have uncovered all the pedestal of this statue, and all the cum-bent [recumbent] or leonine parts of the figure; these were before entirely concealed by sand. Instead, however, of answering the expectations raised concerning the work upon which it was supposed to rest, the pedestal proves to be a wretched structure of brick-work, and small pieces of stone, put together like the most insignificant piece of modern masonry, and wholly out of character, both with respect to the prodigious labour bestowed upon the statue itself, and the gigantic appearance of the surrounding objects.

Page 145

We then descended into some of the smaller sepulchres. The walls of these were adorned with hieroglyphics. In some instances, we noticed the traces of antient painting, an art that seems to have been almost coeval with the human race. The most remarkable instance of this kind was discovered by the author in a situation where, of all others, it was least expected, upon the surface of the Sphinx. As we drew near to view this prodigious colossus, a reddish hue was discernible over the whole mass, quite inconsistent with the common colour of the limestone used in building the Pyramids, and of which the Sphinx itself is formed. This induced us to examine more attentively the superficies of the statue: and having succeeded in climbing beneath the right ear of the figure, where the surface had never been broken, nor in any degree composed by the action of the atmosphere, we found, to our very great surprise, that the whole had once been painted of a dingy red or blood colour, like some of the stuccoed walls of the houses in Pompeii and Herculaneum.

[He goes on to give Coptic and Arabic inscriptions that he found on the Sphinx, now vanished.]

On our descent [from the top of the Great Pyramid] we breakfasted at the base of the Pyramid, and after admiring the graceful outline of the Colossal Sphinx, returned to Cairo, which we reached by two o'clock the same day.

ROBERT RICHARDSON (1817)

*Travels along the Mediterranean and Parts Adjacent* (London: 1822), 2 vols.

Vol. 1, pages 153–57

. . . we proceeded next morning to take a view of the sphinx . . . It stands a little to the east of the two last-mentioned pyramids, and on a much lower level. The lower part of this venerable piece of antiquity, which had for ages lain buried under a load of sand, had been a few months before uncovered by the exertions of Captain Caviglia, with the assistance of the two gentlemen before mentioned, at the time, however, that we visited it, the Arabs and the wind had replaced the greater part of the covering, and the lower extremities of the sphinx were equally invisible as before his operations. The breast, shoulders, neck and head, which are those of a human being, remain uncovered, as also the back, which is that of a lion; the neck is very much eroded, and, to a person near, the head seems as if it were too heavy for its support. The head-dress has the appearance of an old-fashioned wig, or periwig, projecting out about the ears, like the hair of the Berberi Arabs; the ears project considerably, the nose is broken, the whole face has been painted red, which is the color assigned to the ancient inhabitants of Egypt, and to all the deities of the country, except Osiris. The features are Nubian, or what, from ancient representations, may be called ancient Egyptian, which is quite different from the Negro feature; the expression is particularly placid and benign, so much so, that the worshipper of the sphinx might hold up his god as superior to all the other gods of wood and stone which the blinded nations worshipt. The whole of it is cut out of the rock, which is calcareous, easily sectile, and abounding in small bivalve shells; and probably the large excavations in front, and on each side of it, furnished part of the stones for the building of the pyramids. There was no opening found in the body of the sphinx, whereby to ascertain whether it is hollow or not. The back is about 120 feet long; the elevation of the head from 30 to 35 feet above the sand, the paws were said to stretch out on the platform in front of it to the distance of 50 feet. Between the paws were found the remains of a trilithic temple, adorned with hieroglyphics. In front of the temple was a granite altar with four horns, one of which remained, and the marks of fire, from the burning of incense, were visible upon it. Several Greek inscriptions were found on the paws of the sphinx, but none of them older than the second century: one of them is signed Arrianus and is merely an address of the poet of that name to the sphinx as the guardian genius of the king of Egypt . . . [a section describing what Caviglia found is omitted here and also below] . . . The Arabs calls the sphinx *abou el hol*, the father of terrors, or *abou el haoun*, the father of the column, which last seems to favour the above supposition [about a column]. . . . Herodotus makes no mention of this enigmatical figure, yet it is completely Egyptian, and from the great disintegration that it has suffered, we can hardly suppose that it did not exist in his time. Pliny, who is the first author that mentions it, merely states its position in front of the pyramids, and that the inhabitants said it was the tomb of king Amasis, and was brought

there, which he contradicts, by asserting it to be cut out of the rock, but offers no conjecture of his own as to its use or formation. . . . The countenance of this sphinx, however, was that of a man [contrary to the Greek tradition that a sphinx had the head of a woman]. The red colour does not sufficiently characterize the sex, but the beard, which was found between its paws, leaves little doubt on that subject. The expression of almost all the Egyptian figures is so particularly mild and interesting, that without the accession of the beard, they might all pass for females. This figure was entire in the time of Abdallatif, who describes its graceful appearance and the admirable proportion in the different features of its countenance, of which, he particularly mentions the nose, the eyes, and the ears, and says that they excited his astonishment above every thing that he had seen in Egypt; and Makrisi states, that it was mutilated by Sheik Mohammed, called the faster [meaning "fasting from food"] of his time; the same ravenous animal who mutilated the lions that adorned the bridge at Cairo, and who deserved to be a relation of his savage namesake, who attempted to demolish the pyramids, if he were not the identical animal himself.

CHARLES LEONARD IRBY AND JAMES MANGLES (1817)

*Travels in Egypt and Nubia, Syria, and Asia Minor during the Years 1817 & 1818* (London: 1823).

Photographic reprint by Darf Publishers Limited (London: 1985)

Pages 155–58

Wednesday, September 1 [1817]. Our first care now was to shave our beards, which we had allowed to grow from our first departure from Philae, and resume our European costume; we felt as awkward at first at this change of dress, as we did when we first assumed the Arab costume. Mr. [Henry] Salt [the British consul-general in Cairo] received us very civilly. We found that great discoveries had been made at the pyramids and sphinx during our absence; and the first thing that drew our attention was Mr. Salt's elucidative plan of the pyramids, sphinx, and all their interesting environs. As the whole account of the proceedings is going home for publication, I shall only trouble you with a few particulars. On our arrival we found, at Mr. Salt's house, Colonel Stratton, of the Enniskillen dragoons, and Mr. Fuller. These two travellers had come from making the tour of Palestine, having lastly arrived by land from Yaffa and Gaza. They embarked at Constantinople, having first made the tour of Greece. As they had not yet been to the pyramids, we were glad to have an opportunity of accompanying them.

Friday, September 4. We went early in the morning, and Mr. Salt having lent us a copy of his newly made plan, we regularly went over the whole neighbourhood, place after place, according to the plan, we found there was nothing new for us to see, excepting a few of the upper steps fronting the sphinx. Unfortunately for us and all future travellers, they have filled up all the excavations of the sphinx, so that there is not so much to be seen now, as there was previous to our departure, the base having been perfectly cleared on one side, before we started for Upper Egypt. From the several drawings and plans which we have seen, together with the description we have heard, it appears that the indefatigable Captain Caviglia continued his operations till he had cleared all the breast of the animal; that he afterwards pursued his labours till he reached the paws, at fifty feet distance from the body; and here it was, between the two, that he discovered a small temple, views of which are given in this work. I imagine this small edifice was composed of three large, flat stones, like a similar shrine in the possession of Mr. Salt, and that the door was filled up by two smaller pieces of stone on each side of it; these sides have some fine specimens of basso-relievo, and give a fine idea of what

the sphinx originally was A man is depicted as presenting an offering to it, some inscriptions also are interesting, and one of Caracalla has the name of Geta, his brother, erased, as in the Latin inscription at Syene. The lions which were found, together with the tablets, in basso-relievo, have been sent home to the British Museum, where I hope you will see them. The great head of Memnon will please you, and when you contemplate its grandeur, recollect that Thebes has at present the remains of thirty-seven statues of equal dimensions; many greater. Beyond the small temple is an altar To describe the other parts, I must beg you to imagine yourself fronting the face of the sphinx, at a considerable distance, and nearly on a level with the lower part of the face, and also with the ground adjoining the animal As you advance, you find at some distance from the paws, a flight of steps which lead some depth below the paws to the base of the temple. Mr Salt is of opinion that this descent by steps was meant to impress the beholder (after having first viewed the sphinx at a distance on a level) with a more imposing idea of its grandeur, when he views the breast in its full magnitude from below. A wall of sun-burnt brick was on each side of the steps, to prevent the sand from filling up the space. Afterwards we went all over the great pyramid, again descending to the lower chamber, which Captain Caviglia discovered, and also reinspected the well, &c We could not show them Colonel Davison's chamber, as the Arabs had stolen the rope ladder which was left there. After having slept at the mouth of the great pyramid, we returned to Cairo; the excursion occupied us two days. When we were last at Cairo, a trip to the sphinx used to take two hours; we were now five hours going there, the inundation of the Nile forcing us to go more than double the distance round the edge of the canals. We went in a cangia, or rowing boat, as the canal was quite full.

COUNT DE FORBIN [LOUIS-NICOLAS-PHILIPPE-AUGUSTE COMTE DE FORBIN] (1817–1818)  
*Travels in Egypt, Being a Continuation of the Travels in the Holy Land, in 1817–18* (Second Part of Count de Forbin's Eastern Travels, Part One being *Travels in Syria*), issued, with Explanatory Notes in English (anonymous) as an offprint by the *London Journal of Voyages and Travels*, editor Benjamin Bensley (London: September 1819)

Page 19

The colossal sphinx still rises thirty-eight feet above the sand that the winds from the desert are accumulating about it. My arrival was too late to avail myself of the labours of M. [Monsieur Henry] Salt. On clearing away about the base of this statue, he had found steps that communicated with the gates of a little temple erected between the feet of the sphinx. An unpardonable egotism led him to block up again objects which call for an active and vigorous investigation, which would throw great light on the history of the arts in ancient days, would bestow éclat on one of the most sublime monumental fictions to be found in ancient Egypt.

JAMES BURTON (1822)

From Burton's original unpublished manuscript in the British Library  
(MS. Add. 25,619, f. 32)

[Note The spaces marked by ellipses below are words written in the manuscript in Arabic script, which I have not transcribed.]

**Sphinx**



The Sphinx is still called Aboo l'hol, a name by which it was known among the natives 650 years ago, and would seem to strengthen the etymology chosen by M. [Louis] Langlès for the word Belheet . . . or Belhoobeh . . . or Belhooyeh . . . which Makreesy [the historian Taqiyyu 'l-Din al-Maqrizi (1364–1442)] and Syotty [the historian Jalalu 'l-Din al-Suyuti (1445–1505), who wrote a history of Old and New Cairo, among other works] give as the *true* one and which it seems according to M. [Silvestre] de Sacy is written thus in different copies and apparently also Belhoot, . . . according to M. Langlès, which he selects and says is compounded of the words . . . eye and . . . terror The Arab name seems to be a translation of the Egyptian.

The countenance has yet the traces though faint of the red colour with which it was formerly covered, and which 6 or 7 centuries back, was coated with a varnish that then had all the brilliancy of freshness The colour should certainly never be called *yellow*.

[He then quotes book 1, chapter 4 of Abdallatif about the Sphinx (see page 447) and Denon on the Sphinx (see page 489), and he makes some comments on Denon's artistic remarks, which I omit.]

The statue was mutilated by a bigoted enthusiast [old-fashioned term for a fanatic], Sheekh [Sheikh] Mohammed, about year of the Hegira—? [Burton left a blank for the date.] It was probably when the nose was thus broken that the Asp [uraeus] and headdress were removed There is little doubt that it carried these ornaments, from the hole now remaining in the top of the head, which the natives have at some time or other enlarged, in the hopes of finding in the interior some hidden treasure. The head however is solid stone, and they soon found their labour useless. I think I remember Mr [Henry] Salt having told me, that he found in excavating the temple between its paws, part of an asp in bronze. This will have been that placed over the forehead.

The rump was repaired with Mapara [?] stone probably by the Kornans [?]*—*their repairs were destroyed again by the late Defterdar in order to serve as building materials for one of his palaces

Moorad Bey [Murad Bey (d. 1801); see his portrait in figure 2.8 on page 92] first uncovered the Sphinx but found nothing—he did not dig deep. The French then did it, and were equally unsuccessful. [Captain J.-B.] Caviglia finally succeeded, and the accompanying notice of the work is copied from the . . . [here the text breaks off ].

[The verso side of this manuscript leaf has Burton's copy of Henry Salt's plan of the paws and altar of the Sphinx, with identifying letters and specific descriptions. No succeeding leaf has been bound into this manuscript volume, and the subsequent leaves by Burton change subject.]

JOSEPH MOYLE SHERER (1824)

*Scenes and Impressions in Egypt and Italy* (London: 1824)

Page 159

The Sphinx disappointed us; as it does generally, I should think: drawings and prints deceive wonderfully; it has neither the size, the majesty, or the sweetness with which it is usually represented.

Pages 149–53

Returning [from Saqqara], we again called on [Captain] Caviglia. Magic had been at work in his little

hut; plans and drawings were hung all round, concealing and ornamenting its walls; his books established on shelves and tables . . . He declined returning with us that evening to our boat, but said he would himself accompany us to Saccara [Saqqara] on the morrow, which he did. His wish was to show the interior of that pyramid (the same which the Arabs call the Seat of Pharaoh; and here, perhaps, tradition does not err; but the other pyramids are surely sepulchral) opened by the French, he having founded some opinion on the examination of it, which leads him to suppose, that *none of the pyramids were sepulchres*—I leave him to amuse himself with the difficulty. He is a kind man, with much enthusiasm about Egyptian antiquities, having exhibited enterprise and perseverance, and fearlessly expended all he could he is unpretending too, considering his visit to Paris, and the nonsense he heard talked there about Moses and Orpheus, and which, at times, will peep from under his modest avowals, that he is only a sailor [his profession was naval captain], with a strong turn this way, which has made him both labour and read on antiquities. . . . He showed, and with no little pride, a number of the Quarterly Review [volume 19 for 1818], which spoke of his labours with high praise and deserved encouragement. I borrowed the volume . . .

RICHARD MADDEN (1826)

*Travels in Turkey, Egypt, Nubia, and Palestine* (London: 1833), 2 vols.

Vol. 1, page 257

In the time of Aaron Hill (upwards of one hundred and twenty years ago) there was no entrance into the interior [of the Chephren Pyramid, opened in 1817 by Belzoni]; and when Herodotus was in Egypt [his dates were fifth century BC] it was closed.

Aaron Hill asserts that he found a mummy in the sepulchral chamber of the large Pyramid, covered with hieroglyphics; and that from one of the galleries he made his way under ground to the interior of the great sphinx. This indeed savours of the marvellous [i.e., Madden thinks Aaron Hill made it up, which he certainly did; the publications of Aaron Hill on Egypt are entirely fictitious and were commercially motivated publishing hoaxes]

Pages 260–62

More probably *the use of the Pyramids was connected with the celebration of the mysteries of the Egyptian religion*. The narrow oval apertures in the chambers of the pyramids, into which Caviglia thrust joined reeds eighty feet long, without finding any impediment [these are nowadays called the “ventilation shafts”], we know nothing of, or where they terminate. The secrets of the Egyptian religion, in my opinion, are only to be sought in the interior of the Pyramids. It is vain to look for them in the papyri found either in Thebes or Memphis. Hitherto [prior to 1826] all those which have been found have proved totally devoid of interest. Law processes, votive offerings, narrations of funerals, and title-deeds, are the only subjects of the papyri. Mr. Caviglia, with whom I lived for some months at Mr. Salt’s, was strongly of this opinion. his valuable discoveries in the great Pyramid, of the passage of the well [the well shaft, which he was the first to clear of sand and rubble], and of the ruins of temples close to the Pyramids, were published in the Quarterly Review [vol. 19 for 1818]. How much it is to be regretted that commerce alone monopolizes all the enterprise of the affluent, and that no company of scientific men is to be found to invest a capital of five or six thousand pounds in the advancement of science. With such a sum, I believe the real knowledge of the Pyramids might be



attained; and so far as regards the religion and learning of the Egyptians, perhaps for the destruction of the Alexandrian library we might be almost compensated.

I would carry on the excavation of the Pyramids both from the upper chamber and the body of the sphinx, in the direction of the base of the pyramid, at about the same monthly expense as Belzoni in 1817, and in the course of a few years, nay months, I am much deceived if nothing should be discovered to redeem the wisdom of the Egyptians from the libel of having constructed a mountain of infamous architecture, like that of the great Pyramid, containing only two insignificant chambers for the accommodation of the corpse of a tyrant.

JAMES WEBSTER (1828)

*Travels through the Crimea, Turkey and Egypt; Performed during the Years 1825–1828* (London: 1830), 2 vols.

Vol. 2, page 22

We at length entered the desert, and in a few moments stood before the Sphynx. The ridge of the back is seen rough and time-worn; the head dress is made to project behind so as to counterbalance the chin and face; in front, between the paws, a temple has been discovered, for a drawing of which, see No. 38 of the Quarterly Review. [This engraving is reproduced as figure 3.3 on page 132. The sand has now covered up the temple, and in time the head only of the Sphynx will be visible, as before. Much has been done to prevent this by Mr. Caviglia, who erected a wall around his excavations, but the position of the Sphynx, considerably below the level of the pyramids themselves, heaped up a hundred feet by the sands, renders all attempts of this kind hopeless. No effort can save the excavation from being filled up by the sands.

Page 24

The sands have made irresistible progress in the course of ages. The pyramids were, no doubt, on the bare rock: the body of the Sphynx must have also been uncovered. Now, not only are these encumbered, but the rocks, and all along the edges of the fields below them, are covered with the sands—the tide of an ocean that shall never know reflux!

SIR JOHN GARDNER WILKINSON (1835)

*Topography of Thebes, and General View of Egypt* (London: 1835)

Page 331

The Sphinx stands nearly opposite the south-east end of the pyramid of Chephren. Between its paws were discovered an altar and some tablets, but no entrance was visible. Pliny says they suppose it the tomb of Amasis; a tradition which arose, no doubt, from the resemblance of the name of the king, by whose order the rock was cut into this form, Thothmes IV [1425–1417 BC], to that of the Saite monarch. [There was a king Amasis (570–526 BC) of the Twenty-sixth Dynasty, known as the Saite Period; Wilkinson is proposing that the two became confused in later tradition.] But one author [he refers to the Roman poet Lucan] has gone farther, and given to Amasis the pyramids themselves. The cap of the Sphinx, probably the pshent, has long since been removed; but a cavity in the head attests its former position, and explains the mode in which it was fixed. The mutilated state of the face, and

the absence of the nose, have led many to the erroneous conclusion that the features were African; but by taking an accurate sketch of the face, and restoring the Egyptian nose, any one may convince himself that the lips, as well as the rest of the features, perfectly agree with the physiognomy of a Pharaoh; for the reader must be aware that this and all other sphinxes are emblematic representations of Egyptian kings.

[Wilkinson adds in a footnote: "From the name and hieroglyphics on the tablet in front of it, we may conclude it is of Thothmes IV."]

JOHN LLOYD STEPHENS (1835)

*Incidents of Travel in Egypt, Arabia Petraea, and the Holy Land* (Norman: University of Oklahoma Press, 1970)

Page 38

[In his journey to Giza on December 31, 1835, Stephens noted this about the Sphinx:]

Next to the pyramids, probably as old, and hardly inferior in interest, is the celebrated Sphinx. Notwithstanding the great labours of Caviglia, it is now so covered with sand that it is difficult to realize the bulk of this gigantic monument. Its head, neck, shoulders and breast are still uncovered, its face, though worn and broken, is mild, amiable, and intelligent, seeming, among the tombs around it, like a divinity guarding the dead.

ROCHFORD SCOTT (1837)

*Rambles in Egypt and Candia* . . . (London: 1837), 2 vols.

Vol. 1, page 242

In the face of the scarped rock, about a quarter of a mile to the south of the great pyramids, is a Hypogean temple, the entrance of which is also decorated with figures and hieroglyphics. The Arab guides were averse to my entering it. . . . The great Sphynx is to the eastward of this temple; no part of it but the head could be seen, the sand drifts so constantly upon it. It stands on a much lower level than the pyramids.

SIR WILLIAM WILDE (1837)

*Narrative of a Voyage to Madeira . . . Egypt . . . and Greece* (Dublin: 1840), 2 vols.

Page 393

A line of camels slowly pacing across the dreary waste, on which they [the pyramids] stand, or a Bedawee [Bedouin] careering his horse beside the base, give, by comparison, some faint idea of their [the pyramids'] stupendous size, and an Arab pirouetting his charger on the sphinx<sup>\*3</sup> afforded me the desired contrast, at the same time that it showed me what was the magnitude of that emblem of Egyptian reverence and superstition.

## Appendix One

### EXCAVATIONS OF MONSIEUR MARIETTE AT THE GREAT SPHINX

AUGUSTE MARIETTE (1855)

TRANSLATED BY OLIVIA TEMPLE

*Athenaeum Français: Revue Universelle de la Littérature, de la Science et des Beaux-Arts* (Paris: 1855)

Vol. 4, pages 391–92

Learned Societies, Institut de France, Académie des Inscriptions et Belles-Lettres.

#### EXCAVATIONS OF MONSIEUR MARIETTE AT THE GREAT SPHINX

We have already announced the important communications made by Monsieur Auguste Mariette of the Academy on the subject of the excavations at the Serapeum of Memphis. Lack of space prevents us from going into this subject in great detail, and especially of speaking about the excavations that have taken place at the Great Sphinx. In 1833 an English Egyptologist, Mr. [Charles H.] Cottrell, to whom one owes the translation of the work of Monsieur Bunsen [Baron Bunsen, i.e. Christian Carl Josias Freiherr von Bunsen] on Egypt [*Egypt's Place in Universal History* (London: 1848), 5 vols.], found in Florence among the papers of Caviglia, who undertook the first of the extensive excavations around the colossus [the Sphinx], the plan of the two chambers discovered behind the Sphinx, which contained hieroglyphic texts. Monsieur [Samuel] Birch had the thought that if one succeeded in rediscovering these two chambers, the inscriptions in question would reveal the origin of the gigantic statue. M. le Duc de Luynes [Louis-Charles d'Albert, duc de Luynes], alerted to this fact by M. [Vicomte Emmanuel] de Rougé, wished, with his well known liberality, to help our compatriot to pursue this curious quest, and furnished him with the funds necessary for the excavation. This act of generosity was soon followed by an allocation of funds from the French government, and Monsieur Mariette came to clear the Sphinx, which he found to be only a natural rock of which the art of the ancient Egyptians had, so to speak, finished the shapes in order to make the statue of a god. That god is Horus, and the temple where he was worshipped has been rediscovered to the southeast of the colossus [Sphinx; this temple is now called the Valley Temple]. It is an enormous square enclosure comprising a crowd of rooms with galleries made of gigantic blocks of alabaster and granite. This edifice, completely devoid of hieroglyphic inscriptions, like most of the monuments dating from the most ancient pharaohs, dates, according to all probability, from the Fourth Dynasty.

The Egyptians had sculpted the head of the Sphinx and filled up the large natural hollows and molded the shapes with masonry. This colossus is found at the bottom of a sort of pit of which the lateral walls are 20 meters [66 feet] away from each of its sides. Monsieur Mariette admits that in antiquity the water of the Nile could have entered this pit. Later, the Greeks had built the steps discovered by Caviglia for going down into the pit. Against the right side of the Sphinx the traveler had found a huge Osiris statue made of 28 pieces, reckoned to be the number of pieces into which the body of Osiris had been cut according to the Egyptian myth.

The Sphinx has been measured in all of its dimensions. Its height is 19.7 meters [64.6 feet]. In the back and across the hindquarters of the statue, Monsieur Mariette recognized the vertical shaft, the existence of which had previously been pointed out by Vansleb [Johann Wansleben] and [Richard] Pococke, who thought that one could penetrate further down from there into existing chambers, according to their supposition, inside the colossus. This shaft, explored with care, presented at its bottom a roughly hewn room, which was in reality just a natural fissure enlarged by the hands of man. In this room lay some fragments of wood that gave off a strong smell of resin when burned, which led one to believe that the wood came from a sarcophagus.

One had supposed that in antiquity the Sphinx was entirely painted red, but nothing indicates that this had been so. Only the face was once covered in this color after the reign of Rameses the Great, for in the time of that pharaoh, the beard of the colossus represents an act of worship over which the red had been applied.

The Greek inscriptions found near the stairs of the Sphinx tell us that this colossus bore the name of Harmakhis, the significance of which has still not been discovered.

The excavations of the Great Sphinx did not lessen the honor due to the intelligence and to the devotion of Monsieur Mariette in his magnificent discovery of the Serapeum [at Saqqara]. We need to return to this archaeological event before recapturing, as we will be doing in one of the forthcoming issues, the analysis of the works of the Academy since our last survey.

## Appendix Two

### CONCERNING THE AGE OF THE SPHINX AT GIZA

LUDWIG BORCHARDT

TRANSLATED BY ROBERT TEMPLE AND ELEONORE REED

Ludwig Borchardt, Berlin, submitted by Herr Erman *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* [Report of the Proceedings of the Royal Prussian Academy of Sciences at Berlin], Sitzung der philosophisch-historischen Classe [Proceedings of the Historic-Philosophical Class], vol. 35 (1897)

Pages 752–60

The question concerning the date of origin of the Great Sphinx at Giza, approached from a different direction than has been done heretofore, shall be the task of the investigation that follows. The previous investigators have been guided in their opinions either by the mention of the name Chephren in the Sphinx stela of Thutmosis IV [the “Dream Stela”], or they have imagined that they saw some similarities in the type of the countenance of the Sphinx itself, and have arrived at differing conclusions among themselves. It is precarious, to say the least, to attempt to maintain the first approach, which concerns the name of Chephren, since the inscription referred to speaks of nothing more than a name adjoining a large gap in the surrounding passage of text, possibly completed as Chephren [only half of the name is preserved, and the rest has flaked off ], in combination with some statue. It is not at all clear that the Sphinx is somehow referred to here. The second approach, which presumes to elicit something from the type of countenance, is even more uncertain, the face is so ruined that unless some other indices can be added to this, one can scarcely infer anything from it.

In what follows an attempt shall be made to arrive at a date based on details of dress, since for the present that seems to be the only safe way to date Egyptian sculptures, whereas for the treatment of such questions from the purely stylistic point of view there exists up to now neither sorted material nor sufficient preparatory work. We must for the moment content ourselves in the research that confronts us with settling the question solely as a matter of dress, by setting strictly aside all stylistic observations relating to the treatment of the actual portrait, the musculature and so forth, and thus reducing the question to something visibly obvious and tangible—or, I might even say, numerical.

The first criterion of this kind with which we shall deal concerns the eye-paint stripes which are found projecting from the outer corners of the eyes of the Sphinx in entirely flat relief and with traces of blue pigment. Regarding these, we should need to apply the law, recently discovered by Herr [Baron] von



Bissing, that eye-paint stripes were unknown in the Old Kingdom. That this is so is shown by the following statistics, which unfortunately only refer to what is in the Cairo Museum, but which could hardly be modified by objects from other collections.\*<sup>4</sup>

The Cairo Museum possesses in its Old Kingdom halls and storage areas over 230 statues and fragments of statues with heads which date from the Old Kingdom [this was in 1897], none of these have any eye-paint stripes. In this account the following are not counted:

- Fourteen statues of kings which bear the names of ancient kings are exhibited in the Old Kingdom halls, but on many grounds which would take too long to discuss here, these can in no way be viewed as works of such an early period; further
- Three painted wooden statues (Numbers 289–311, Catalog 1895, page 28, Hall 11, Case A) from Akhmim and Luxor which are placed by mistake in the halls of the Old Kingdom, but are not ascribed to the Old Kingdom, and
- One torso of a queen (Number 255, Catalog 1895, page 15, Hall 3, Case B) found at Abydos by Mariette, which he affirmed (Mariette, Catalog Number 516) might perhaps be the oldest of Egyptian art, but which contemporary art historians date either as Ptolemaic or Roman.

All of these\*<sup>5</sup> show the eye-paint stripes, and so they should, because none of these sculptures belongs to the Old Kingdom.

Only a single statue that can with certainty be dated from truly ancient times shows eye-paint stripes; it is a painted wooden statue found at Meir of a standing naked girl, perhaps a dancer (Number 248, Catalog 1895, Supplement 2, Number 1340b, Hall 2), which is placed together with the contents of the grave of Pepy-nonh-kern in the same display case, but differs from the works in this grave find, so that the possibility cannot be discounted that it may have been reckoned among these grave goods in error. If we discount this possibility, we have the first appearance of eye-paint stripes during or after the Sixth Dynasty, which was the time when all the radical changes in dress and customs appeared, which separate the Middle Kingdom from more ancient times, so that certainly in terms of the history of art, but perhaps also in the political sense, one can properly speak of the Middle Kingdom having begun with the Sixth Dynasty.

What we have ascertained from the statues is shown also by the reliefs. Prior to the Sixth Dynasty, eye-paint stripes cannot be demonstrated anywhere, but thereafter they make their appearance everywhere: thus, they appear on the *udjat* eyes on the stelas, on coffins, in grave paintings, and even in the [hieroglyphic] sign in the writings

A single plausible exception is known to me: on the false door of the grave of Schery (Giza, Catalog 1895, Number 13, Hall 1, from Saqqara) one of the women, if one looks really closely, has eye-paint stripes on her eyes, although none of the other figures bears any sign of any. Even though Schery was a priest of the kings Send and Peribsen of the Second Dynasty, the false door does not yield any signs that it also dates from such ancient times. It reminds us rather of the works from the end of the Old Kingdom, especially where the style of the sunken hieroglyphics is concerned. Therefore I believe that, at least until the opposite can be proved, one has to come to the following conclusion: the makeup stripes appear, at least where statues are concerned, at the earliest during the Sixth Dynasty, but become more widespread only during the Middle Kingdom.

Now, the Great Sphinx has obvious eye-paint stripes. Therefore the time of its creation falls into the period subsequent to the Sixth Dynasty.

Just as this criterion has given us the lower date limit, so we can find the upper limit in the ornaments of the headdress, the so-called King's Bonnet. This decorated piece of cloth lying over the forehead with the uraeus, which is the symbol of the kings, is tied firmly to the forehead with a headband. It frames the face, creating two triangular areas which fall in two pleats on either side of the face, down the neck, and onto the chest. At the back it is gathered together and ends in a plait lying down the back, which is ribbed as well as appearing to be wrapped. The pattern that this scarf shows is in most cases the following: the front folds are, as shown in A, both in frontal view and also in section, folded into horizontal pleats, the piece covering the head, however, is divided into regular alternately sunken and raised stripes (figure B), which with statues of which the painting is still showing, is depicted in alternating yellow and blue shades.



Figure A



Figure B

This King's Bonnet was of course fashion-dependent, and so we can at least in the statues follow different variations through time. From the Eighteenth Dynasty, or perhaps even a little earlier, it becomes fashionable to supply the inside with a vertical smooth hem.<sup>\*6</sup> Around the Nineteenth Dynasty, it becomes common practice to extend the regular division of the stripes of the upper part of the front pleats to the chest by giving up the pleats,<sup>\*7</sup> and at the same time they now divided the ribbed plait instead into sunken or raised horizontal stripes.

The Great Sphinx of Giza also shows yet another pattern in its headdress. The stripes of that headdress given as sunken are arranged in groups of three stripes each, that is, one wider stripe is always placed between two narrower stripes. Each of the wider stripes has on either side a small accompanying stripe. And this differs from the usual arrangement with stripes of equal width. And therefore we also have to examine where and when this anomaly occurs.

The following list, which shows those kings' statues with the stripes that are grouped in this manner,<sup>\*8</sup> will show this immediately. We must distinguish between two different forms: those with completed groups (figure C) and those where they are only indicated in simple lines (as in figure D). Both types of course belong to the same type; the second is only an abbreviation of the first.



Figure C



Figure D

In the museum at Giza I could make the following observations:

1. Number 384 (Catalog 1895, Number 125, Hall 16). Torso of a statue of the Twelfth Dynasty, usurped and reused by Merenptah-Hetep-her-maat. Cap stripes of type C.
2. Number 385 (Catalog 1895, Number 1370, Hall 16). Statue of Amenemhet III. Stripes of type C.
3. Number 430 (Catalog 1895, Number 226, Court 28). Statue of the Twelfth Dynasty.<sup>19</sup>
4. Number 432 (Catalog 1895, Number 196, Hall 26). Statue of the Twelfth Dynasty, usurped and reused by Ramesses II. Stripes as in C.
5. Number 481 (Hall 63, Cabinet A). Head of the type of Amenemhet III.<sup>10</sup> Stripes as in C.
- 6./7. Numbers 482/3 (Hall 63, Cabinet A) Two heads of the type of Amenemhet III. Stripes as in D.

In the Berlin Museum, at my request Herr Schaefer was so kind as to check through the originals and casts:

8. Number 1121 (Catalog, page 331). Statue of Amenemhet III, usurped and reworked by Merenptah. Stripes as in C. The stripes of the apron show the same pattern.
9. Number 7264 (Catalog, page 24). Statue of the Twelfth Dynasty, usurped and reused by Ramesses II and Merenptah. Stripes as in C.
10. Number 11,348 (Catalog, page 58). Upper part of a statue of the type of Amenemhet III. Stripes as in D.
- 11./12. G. 388/9. (Catalog, page 331). Casts of the statue of Amenemhet III at St. Petersburg, with reference to this type (see Golenischeff in *Recueil de Travaux*, 1893, plates 1–3). Stripes as in D

In Paris, where again I owe the material to Herr [Heinrich] Schaefer, we find only one such statue:



13. Number 23 (de Rougé, *Notice des mon* , page 22). Sphinx of the Twelfth Dynasty of Apophis, later usurped by Merenptah-Hetep-her-maat. Stripes as in C. [Translator's note: This is the Sphinx of Amenemhet II, which is discussed at length in chapter 4 of this book and is identical with the face on the Great Sphinx of Giza. It should be noted that Borchardt had not seen this sphinx A23 personally but had merely received information from Heinrich Schaefer that it had the correct pattern of stripes. Nor was a photo of it supplied to Borchardt, or he would probably have recognized the face instantly.]

In London, where Mr Griffith has kindly checked through the available material, there seemed to be in the Museum no statues which could be used here as examples.

In England in private ownership we find:

14. Head of the type of Amenemhet III in the Grenfell Collection (Burlington Fine Arts Club, the Art of Ancient Egypt, 1895, photo number 51). Stripes as in D

15. Head of the type of Amenemhet III, owner unknown (op. cit., photo number 43). Stripes as in D.

Of the other collections, I have checked through the photographs, which are kept in the Berlin Museum, but have not found any further cases of the order of stripes that we are discussing here. So the result of this compilation is clear:

The grouped stripes on the King's Bonnet are only found during the Twelfth Dynasty, perhaps only under Amenemhet III, because those pieces that are precisely dated and that have such an arrangement of stripes are all from his time. And of the others, which are only dated generally to the Twelfth Dynasty, it can never be discounted that they also might be images of Amenemhet III. For this more narrow limitation of this fashion of stripes to the time of Amenemhet III speaks as well as the circumstance that the statues of Usertsen from Lisht (Giza, Numbers 411–20, Catalog 1895, Supplement 3, Number 1365, Hall 21) have not grouped but merely regular stripes [see figure 4.18]. But whether or not one wishes to limit the time of the grouped stripings to the reign of Amenemhet III, one thing is for certain: after the Twelfth Dynasty, this fashion has vanished. The statues of the Thirteenth Dynasty, Sebekhotep (Louvre, Cast G 1, Catalog S. 332, Berlin) and Sebek-em-sa-f (Giza, Number 386, Catalog 1895, Number 128, Hall 16), already display the regularly striped King's Bonnet.

So for the dating of the Sphinx at Giza we draw from all of this the following conclusion. Because the headdress of the Sphinx shows the wide stripes with the narrow accompanying stripes, the Sphinx therefore can surely not have been created after the Twelfth Dynasty.

We have now enclosed the origin of the Sphinx within two limits, an upper and a lower.

According to the makeup stripes, it is Sixth Dynasty or later. According to the stripes on the headdress, it is before the end of the Twelfth Dynasty. If one wishes to be less cautious, one can add to this perhaps the time of Amenemhet III.

For this dating, we can also add some other minor facts to which we do not however wish to attribute too much weight:

- The lack of any mention of the Sphinx in the Old Kingdom, as far as we know from any inscriptions discovered up till now
- The lack of finds from the Old Kingdom in the immediate vicinity of the Sphinx.

- The occurrence of two vertical shafts on the back of the Sphinx, one of which ends in a burial chamber, in which coffin boards have been found.<sup>\*11</sup> From this we can infer the earlier existence of a mastaba on the back of the Sphinx.
- The original beardlessness of the face,<sup>\*12</sup> exactly as Amenemhet was usually depicted.
- The occurrence of a divine image in front of the chest of the Sphinx between its paws, exactly as with the Middle Kingdom sphinx from El Kab (Giza, Number 391, Catalog 1895, Number 139, Hall 16) The traces of this divine image are still clearly visible in front of the chest as a protruding piece of stone.

Finally, if one really wants to, one could even read the type of Amenemhet III's face into the countenance of the Sphinx. But as I have said already in my introduction, this is a rather questionable argument because of the destruction of the features

One could imagine the history of the Sphinx in general, mixed with some guesses, in the following manner:

The Sphinx was hacked out of the bedrock, perhaps by Amenemhet III, by destroying one of the mastabas standing on a hill, which now constitutes the back of the Sphinx, and partly by building it up with ashlar blocks. It shows the king in the shape of a prostrate lion with a human head—in front of the chest with a divine image, perhaps of Harmachis or Khepra. When later the monument was largely buried, Thutmosis IV had it cleared for the first time. On the stela celebrating this fact we find already the mixing of the meaning of the image of the Sphinx itself with the divine image in front of his chest.<sup>†13</sup> Perhaps it was then that the braided divine beard was added to the image.<sup>†14</sup> The Sphinx must have been partially freed from the sand in the Nineteenth Dynasty<sup>§15</sup>

In a later time, the Sphinx was surrounded by a high brick wall in order to protect him from the drifting sand.<sup>\*16</sup> From the east, a large staircase<sup>†17</sup> led down to the small chapel in front of the divine image in front of the chest.

All these means of protection have not helped a great deal.<sup>†18</sup> In this century one has had to dig him out again repeatedly, last in 1883, and actually it would be necessary again today.

## Appendix Three

### SPHINX

JAMES BURTON (1822)

Taken from Burton's original unpublished manuscript in the British Library: MS. Add. 25,619, f. 32: [Note: The spaces marked by ellipses below are words written in the manuscript in Arabic script, which I have not transcribed.]

### Sphinx

The Sphinx is still called Aboo l'hol, a name by which it was known among the natives 650 years ago, and would seem to strengthen the etymology chosen by M. [Louis] Langlès for the word Belheet . . . or Belhoobeh . . . or Belhooyeh . . . which Makreesy [the historian Taqiyyu 'l-Din al-Maqrizi (1364–1442)] and Syotty [the historian Jalalu 'l-Din al-Suyuti (1445–1505), who wrote a history of Old and New Cairo among other works] give as the *true* one and which it seems according to M. [Silvestre] de Sacy is written thus in different copies and apparently also Belhoot, . . . according to M. Langlès, which he selects and says is compounded of the words . . . eye and . . . terror. The Arab name seems to be a translation of the Egyptian.

The countenance has yet the traces though faint of the red colour with which it was formerly covered, and which 6 or 7 centuries back, was coated with a varnish which then had all the brilliancy of freshness. The colour should certainly never be called *yellow*.

[He then quotes book 1, chapter 4, of Abdallatif about the Sphinx, a passage that we have already printed.]

[He then quotes Denon on the Sphinx, a passage we have already printed, and makes some comments on Denon's artistic remarks, which we omit.]

The statue was mutilated by a bigoted enthusiast [old-fashioned word for a fanatic], Sheckh [Sheikh] Mohammed, about year of the Hegira—? [Burton left a blank for the date ] It was probably when the nose was thus broken that the Asp [uraeus] and head dress were removed. There is little doubt that it carried these ornaments, from the hole now remaining in the top of the head, which the natives have at some time or other enlarged, in the hopes of finding in the interior some hidden treasure. The head however is solid stone, and they soon found their labour useless. I think I remember Mr. [Henry] Salt having told me, that he found in excavating the temple between its paws, part of an asp in bronze. This will have been that placed over the forehead.

The rump was repaired with Mapara [?] stone probably by the Kornans [??]—their repairs were

destroyed again by the late Defterdar in order to serve as building materials for one of his palaces.

Moorad Bey [Murad Bey, died 1801; see his portrait in figure 2 8 on page 92] first uncovered the Sphinx but found nothing—he did not dig deep. The French then did it, and were equally unsuccessful. [Captain J -B.] Caviglia finally succeeded, and the accompanying notice of the work is copied from the [here the text breaks off ]

[The *verso* side of this manuscript leaf has Burton's copy of Henry Salt's plan of the paws and altar of the Sphinx, with identifying letters and specific descriptions. No succeeding leaf has been bound into this manuscript volume, and the subsequent leaves by Burton change subject.]

## Appendix Four

### A DESCRIPTION OF GIAMBATTISTA CAVIGLIA'S EXCAVATION OF THE SPHINX

TRANSLATED BY STEFANO GRECO, WITH NOTES BY ROBERT TEMPLE

Privately published by his friend Annibale Brandi in 1823, from what is believed to be the only surviving copy.

A.B. [Annibale Brandi] *Compendious Description of the Pyramids of Giza in Egypt* (Livorno: Stamperia della Fenice, 1823).

[The final portion of this booklet dealing with the Sphinx is given here.]

Also important are the discoveries made when excavating around the Andro-Sphinx, and concerning the opening of various tombs located in the vicinity of the pyramids, as we will see in the continuation of these memories of mine. The short time that I was at the pyramids and my poor talent don't allow me to give a very exact description. However, assisted by cultivated people's advice, I continue as much as I can to describe what Mr. Caviglia accomplished.

This same Caviglia, after examining the Great Pyramid of Giza and discovering the continuation of the [descending] passage to the length of 280 feet further than was known, with a room at its end [now called "the Subterranean Chamber"], the link between that passage and the well shaft, and the small room of dark granite at the left corner of the tunnel, after cleaning the chambers of rocks and earth, and taking note of the fact that he didn't have any other clues to find new chambers, left the Great Pyramid to look for other antiquities in the vicinity. And these initiatives of his, to say the least, were not fruitless.

In fact, he commenced two separate works at the same time. One was clearing the sand from the body of the Sphinx, and the other was to examine a tomb close to the Great Pyramid. In this he found a statue of stone and various busts, and it is remarkable that in the corridor of the entrance there are some apertures, from which one can see the internal rooms where there were the mummies and their statues, and from these apertures probably the relatives of the deceased could observe the mummies that they were visiting, from time to time.

The Sphinx, which is the custodian of the sacred valley, should rather be called "Andro-Sphinx," i.e., the body of a lion with a human head, which was in fact the Theban Sphinx [he is referring to the Sphinx of Greek mythology, which was near Greek Thebes; he is not referring to Thebes in Egypt], with the beard and with the serpent [uraeus] on its forehead. The head, with an opening in its skull, which is about 7 feet deep, was cleared along with a part of its body to a depth of 30 feet. Caviglia then cleared the rest all the way to the base on the side of the face and from another side [the north side], which is 75 feet high.



The body of this colossus, in order to counteract the rough aspect (because of its delicate condition) of the calcareous rock of which it was sculpted, was embellished with hieroglyphs, which were similar to the ones of the Egyptian doctrines, and it was painted red also on the beard. The red color was sacred to the Egyptians. On the surface of its base they found the head of the serpent [uraeus], even though the rest of it was remaining on the forehead. At the end of the beard there are depicted two persons who are making offerings. Beneath the beard, at the distance of 8 feet, there is a small temple 12 feet tall, 8 feet wide, and 7 feet long.

The innermost wall of this [in front of the Sphinx's chest; he is referring to what we now call the Dream Stela, shown in figures 2.9, 3.3, 3.5, 3.7, 3.8, and 4.19] is a big tablet of red granite, completely full of hieroglyphs very well executed. [The bottom half of the inscription seen by Brandi has now vanished.] In the upper part of this there is a winged snake; a row of hieroglyphs divides the table in the center. From one side and the other inside two temples, there are two Theban Sphinxes to which two persons are making some offerings. The one on the left is offering a vase, and the one on the right side seems to have a hand in the fire, and with his other hand he seems to be pouring some liquid for perfumes. Both have triangular aprons [triangular aprons were worn by the pharaohs, and the "two persons" are two different images of Pharaoh Thothmes IV]; in the first, two serpents form a stair of seven steps, and in the second one the same serpent forms five steps, in the rest of the tablet there are other hieroglyphs and in the bottom part there are two crosses, not of the usual form. [This suggests that the Dream Stela inscription was intact at the time Caviglia excavated it, and that the loss of the bottom half of its inscription was due to damage inflicted on the stela after his sudden departure from Egypt because of a serious case of sunstroke, and that this damage to the lower half of the stela was intentional.]

The two sides [of the temple area] are of limestone and are also full of hieroglyphs. If facing outward from the Andro-Sphinx toward the paws, the scene is one of a normal wall guarded by a lion 2 feet long and made of white marble, about 25 feet away. But if facing the Andro-Sphinx, one can see another wall, 6 feet tall, with a window in the middle, located at the entrance of the small temple. In front of this window there is a base with a small granite column, which covers the hole of the window, and it seems put there specifically to block the view inside the small temple. On this wall there are another lion and a bird, representing the Egyptian Minerva, with some heads of statues. At the end of the paws, they also found a poem referring to the Andro-Sphinx, whose Egyptian mysteries are carved in Greek. [This is the poem by Arrian, inscribed on the middle toe of the left paw, now covered with "restoration blocks," which has been discussed in chapter 6, pages 316–23.] On other stones, also in Greek, there are some dedications to the same Sphinx.

The discovery of this table and of its hieroglyphs has deeply touched the fantasy of the superstitious Egyptian women of the near villages, who come numerous times to touch it and to take some pieces of it, believing it could help their fecundity, even though the Egyptians are already helped very much by the god of the orchards. [Evidently, the bottom half of the inscription of the Dream Stela was destroyed in this way, as it was intact when Caviglia excavated it, but not for long. I do not know what the god of the orchards refers to, but perhaps it is some local fetish image.]

Caviglia descended to an underground tomb, and found a large chamber containing an impressive sarcophagus of granite with its cover, in very good condition. [This is apparently the so-called Osiris Shaft beneath the Causeway of Chephren. Caviglia was the first European to discover it, as James Burton also records in his manuscript record.] He opened another tomb and he found a corridor with some hieroglyphs referring to the arts but mainly to agriculture, which was source of the richness of the nation, with the instrument that is shaped like alpha, which the Greeks have taken as the first element of their

alphabet. In another subterranean tomb, he found four corridors. In the first, there still are some hieroglyphs referring to the arts and sciences. The second one is full of the same hieroglyphs, and some sea fights are visible. From here to the left, one can enter the third corridor, which is entirely smooth, and at the right hand, the fourth corridor is also decorated with the same hieroglyphs, on the internal wall of which there is a niche in which there probably was a statue, because from both sides of it there are some characters presenting various offerings. On the right side of this corridor there are two more openings, which may lead to other corridors and rooms.

He opened many more tombs, in which he found other rooms, some of them with hieroglyphs; but since they had to enter the greater part of these by descending the shafts, they did not find much, because there was no way to breathe for those who entered

Caviglia entered and opened a small pyramid, the one in front of the Great Pyramid, on the east side, and there he found rooms and passages that are more comfortable than the ones of the Great Pyramid. After excavating a lot in this one, and after searching in the subterranean passages, he found the space of a lodge which resembles the antrums of Minerva, this space consists of four small caverns, excavated in the calcareous rock. The upper part of the door jamb of the first cavern is the biggest one and has the shape of a cylinder, where there are two eyes sculpted, one being big and the other small with a square on the right and a rectangle on the left, I don't understand what they refer to. In the left wall there are quite-well-preserved hieroglyphs, and above them all a seated statue, in front of which a bended figure which seems to be playing a harp, and further there is a scribe, maybe noting the names of the ones who enter the boat of Charon, which is very well decorated, and they leave to cross the [River] Styx. [This is an attempt to explain the Egyptian pictures in terms of Greek myths.]

In this cave there is the passage to another superior and smaller one, whose door jamb is also cylindrical but with no sculptures. This cave is linked to another one, from which it is possible to enter a small room. From the main cavern it is possible to descend to a deep subway, where probably there was what we would call "the Terrible Hall of Judgement." There is nothing else which is remarkable about these two pyramids, which are in the middle of a large, sandy valley. The small pyramid [of Mycerinus] is not accessible, because so far, nobody has ever succeeded in removing all the stones that surround it, and it seems, as they say, that it is not worthwhile to go to the trouble of trying to find its entrance. The other five pyramids are very far from these, and they are in northern Egypt, but they are not as beautiful as the ones of Giza. The perpendicular height of this Great Pyramid is 462 feet tall, i.e., 70 *tese*, and its sides are 660 feet long, i.e., 110 *tese*.

[Note *tese* is plural for *tesa*, which was an Italian unit of linear measurement at this time, sometimes also used as a volumetric unit. The unit was borrowed from the French during the Later Middle Ages, the Middle French name being *toise*, from the Late Latin word *tesa*, from the earlier Latin *tensa*, meaning "outstretched arms," via Mediaeval Latin *tensa*, *teisa* meaning "expanse, extent," and also from Latin *te(n)sa/tensus/tendere*, "to stretch," hence "the stretch, reach, extent, or size of (a road)." The value of this unit varied enormously in nineteenth-century Italy between the value of 1.414 meters at Novara and the value of 2.242 meters at Bardonecchia. (As a volumetric unit, it varied similarly, and was approximately 2 cubic meters.) Brandi is using *tese* in a loose sense, not a precise sense, to mean in the first instance 6.6 feet and in the second instance 6 feet; however, the feet are apparently not English feet but French feet of the nineteenth century, *piedi*, or *piedi* "del Re." Brandi's use of this now obsolete unit of measurement, the *tesa*, and the fact that he contradicts himself in terms of its value in the two instances he gives, means that he is only being approximate. Hence we do not really need to concern ourselves with his mention of *tese*, but just in case there are those who might worry, I have given this survey of the issue,

in order to lay it to rest.]



## Appendix Five

### SCIENTIFIC VISUAL DOCUMENTATION OF THE SPHINX

The following images—"Sphinx Figures"—were all drawn by Mark Lehner or under his supervision, on behalf of an international research project on the Sphinx, and are all from his lengthy report, "Documentation of the Sphinx," in *The First International Symposium on the Great Sphinx, Book of Proceedings*, Cairo, 1992. I have used Lehner's own figure numbering and include his explanatory captions, either in whole or in part, in quotation marks, keeping my own additional comments separate from his so that it is obvious that my opinions are my own and not his. He shares no responsibility for any of my views and, in fact, he holds contrary ones. The Cairo reports of 1992 are hard for people to obtain (I bought mine in Cairo), and I am pleased to give a wider circulation of these illustrations to the general public, as they deserve to be much more widely known than they are at present.

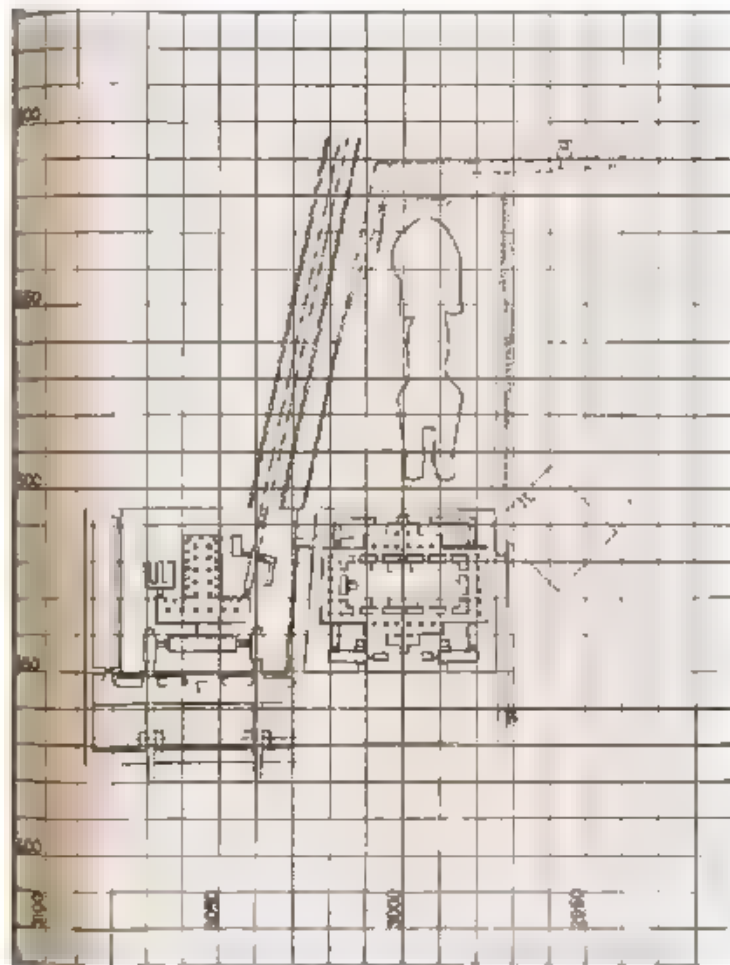


Figure 1. This figure is described by Lehner as "the local Sphinx grid of the ARCE Sphinx Project." (ARCE stands for the American Research Centre in Egypt, with which Lehner is affiliated, as he is an American ) This plan is incomplete for the Valley

Temple some of whose internal features are omitted, though they are perhaps not relevant to a symposium on the Sphinx. I am puzzled by this grid showing the Sphinx facing the western wall of the Sphinx Temple directly. I know that all existing plans do show this, including those of the excavator Herbert Ricke (see figure 6 52), and the evidence of the naked eye certainly suggests the same at ground level. However, I would call your attention to the aerial view of the Sphinx seen in figure 4 2, which appears to offer incontrovertible evidence that the Sphinx is really facing the North Trench, just north of the Sphinx Temple, rather than facing the western wall directly. I don't know whether some bizarre optical illusion is at work here. I am inclined to believe that the optical illusion is the one at ground level and that the aerial photo is the more reliable evidence. I certainly never noticed anything odd at ground level, and so I am not accusing Egyptologists of being dolts, I am just pointing out that we may all be wrong about this. I call for a new and ultra-precise survey to establish the truth about this enigma. Is the Sphinx facing the North Trench, as suggested by the aerial photo, or not? If it is, then this plan and all the other existing plans are in error. There is no use in our burying our heads in the sands of Giza, we must find out the truth about this point, as it may have importance. We absolutely have to know the exact truth about the orientation of the Sphinx.



Figure 2: Lehner says of it: "Photogrammetric front elevation and profile of the Sphinx, contour interval is 25 cm. Original drawing is scale 1:50." I think we should note that the altar, though spaced evenly between the paws, is not centered with the Dream Stela, or the sphinx axis. This suggests to me that the Sphinx really is skewed to its left (to the right in this drawing) and is actually facing the North Trench. However, I do not insist upon anything, as we need a proper survey before anyone can be certain of anything regarding this matter.



Figure 3. Lehner says, "Photogrammetric south elevation of the Sphinx. Ancient masonry that showed as of September 1979 is shaded. Original drawing is scale 1/50." The tiny head is clearly seen here to be out of proportion with the vast body.



Figure 4. Lehner says "Photogrammetric north elevation of the Sphinx. Ancient masonry that showed as of September 1979 is shaded. Original drawing is scale 1/50." The entrance blocked up by Baraize in 1926 at the base, just behind the Sphinx's head, is shown here as modern masonry.



Figure 5. Lehner says: "Photogrammetric profiles of the Sphinx, approximately every 5 m, laid onto the base outline of the Sphinx. Original drawing is scale 1/50." This may look uninteresting, but in fact it is an extremely useful study of the successive profiles, and it has the merit of showing particularly clearly the four strange stone "boxes," two on the north side and two on the south side, that protrude from the Sphinx at the base. No one really knows what they are, although some or all may well have been statue bases. (There is some surviving evidence suggestive of the possibility that a statue of Osiris was erected on one of them.) Of course, some of these bizarre "boxes" may be connected with entries to the interior of the Sphinx. We don't know how old they are, but it is doubtful that any is older than the New Kingdom, and some may even be Roman. They have never been sufficiently studied.

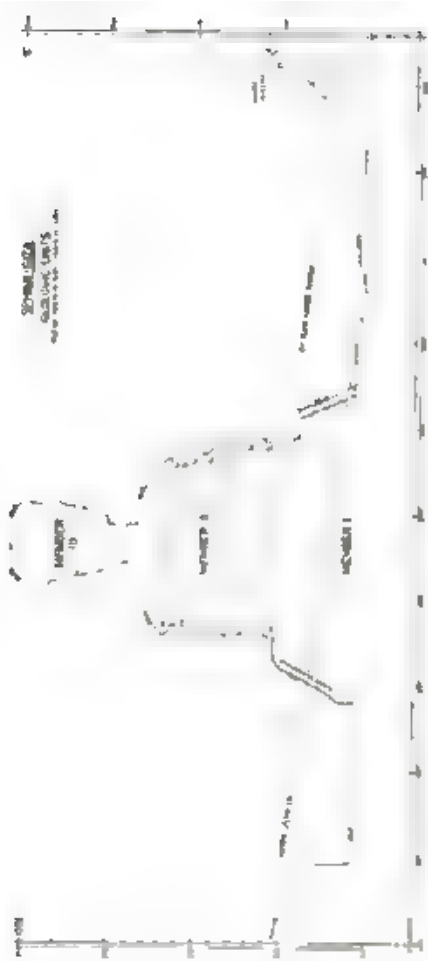


Figure 6. Lehner says "Profile of the Sphinx face, chest, and sides of the Sphinx ditch with geological units indicated. Original drawing is scale 1.50." The purpose of this drawing is to show the successive geological strata of the limestone from which the Sphinx is carved, all of which are slanting as shown. "Member III," of which the head is carved, is a stronger limestone layer than is "Member II," of which the chest is carved.

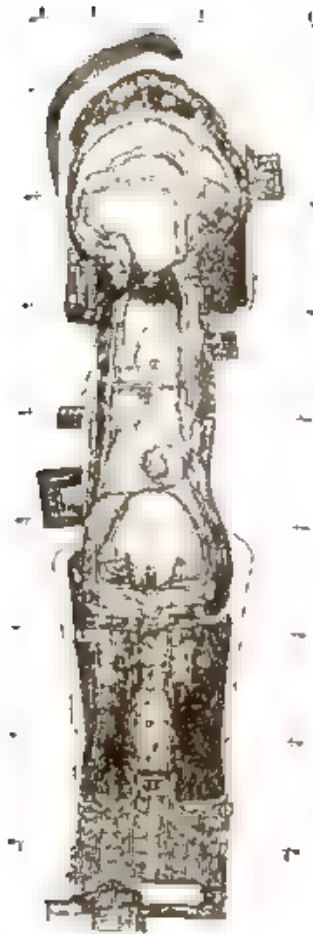


Figure 7 Lehner writes. "Contour map of the Sphinx natural rock core body; contour interval is 10 cm. Original drawing is scale 1:50." This useful plan shows that the altar area between the legs of the Sphinx and its extension eastward are skewed to the south. This may really mean that it is the Sphinx itself that is skewed to the north. Only a more careful survey can tell us. This plan shows how the four strange boxes are made of small stones.

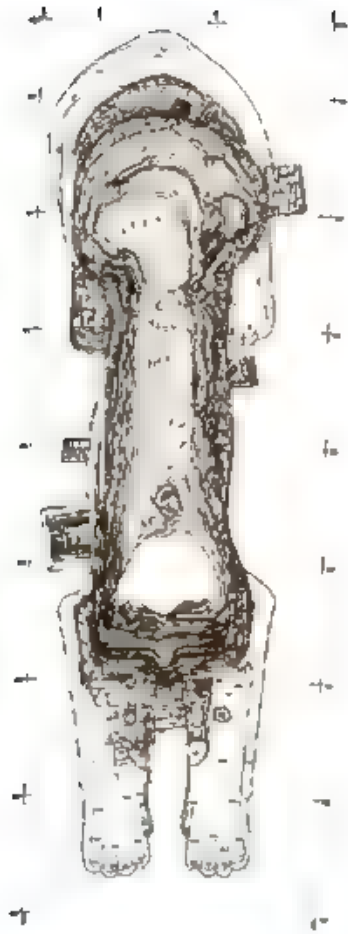


Figure 8 (wrongly described in Lehner's text captions as figure 9) Lehner says: "Form-line master plan of the Sphinx. Original drawing is scale 1:50." (Figures 8 and 9 have their captions mixed up in Lehner's text as published, but that is rectified here )

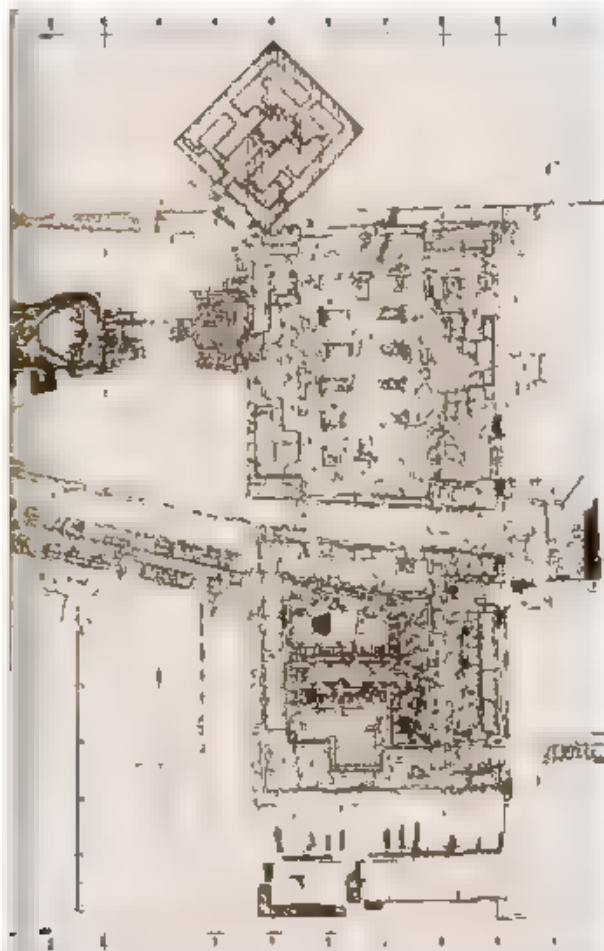


Figure 9 (wrongly described in Lehner's text captions as figure 8) Lehner says "Detailed map of the temples in front of the Sphinx, Khafre [Chephren] Valley Temple, left, Sphinx Temple, right: Amenhotep II Temple, upper right. Original scale 1:100." The small Amenhotep Temple at far right (see figures 7.3 to 7.5 on pages 327 and 328) dates from the New Kingdom and was built when the existence of the Sphinx Temple beside it was unknown and covered in a mountain of sand. The corridor between the two major temples is well shown here and is discussed at length

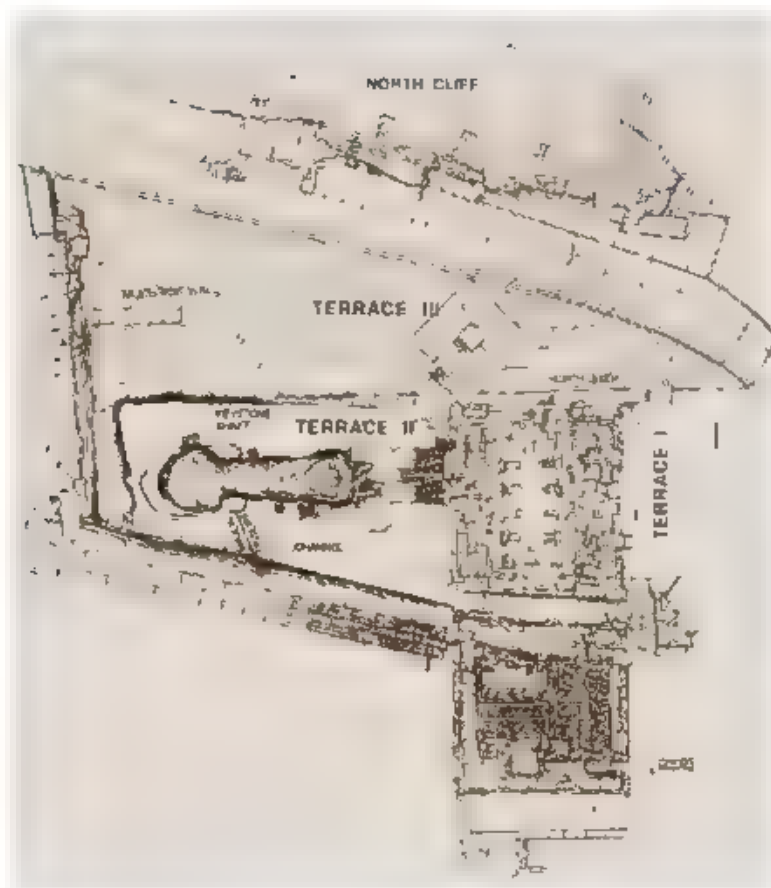


Figure 10. Lehner writes "Map of Sphinx 'amphitheatre'. Contour interval is 50 cm. Original drawing is scale 1:200."





Figure 11. Lehner says: "Map of bedrock units. Member I (base), Member II (Sphinx body), and Member III (Sphinx head) " The diagonal crack going across the haunches in the underlying bedrock from northwest to southeast is well shown here, and it crosses the Sphinx at precisely the point where the huge blob of modern cement placed by Baraize in 1926 may be seen. The crack in the bedrock was probably caused by the shock associated with the intrusion of the shaft and construction of the chamber below.



Figure 12 Lehner says: "Map of dip plane of Member II through Sphinx 'amphitheatre', contour interval is 50 cm "

## FOOTNOTES

- \*1. [The original French text says: *Devant chacune des trois pyramides se voyent encore des vestiges de certains bastimens quarrez [obsolete form of the word carré], qui semblent avoir esté autant de Temples, & á la fin du pretendu Temple de la seconde pyramide est un trou, par lequel quelques-uns croyant qu'on descendoit de dedans le Temple pour aller dans l'Idole, qui est éloigné de quelques pas de ce trou.*]
- \*2. [The original French text says: . . . *il y auroit plus d'apparence de croire qu'on y entrast par le trou que i'ay dit estre dans le pretendu Temple de la second pyramide, ou plustost encor par un autre trou qui est á costé de cet Idole, & fort proche; ces deux trous sont fort estroits, & Presque tout bouchez de sable, c'est pourquoy nous n'y entrasmes point, ne sçachans mesme si nous n'y trouverions point quelques vipers ou autres bestes venimeuses; mais quand après avoir percé les rochers, on seroit venu dans cet Idole, par ou seroit sortie la voix de ce feint Oracle, puis qu'il n'y a point de trou á sa bouche, ny á son nez, ny á ses yeux, ny á ses oreilles?*]
- \*3. [Wilde adds in a footnote: "The sand has again accumulated so much on the back of the sphinx, that it is easy to ride to the top."]
- \*4. The numbers given for the Cairo Collection are those of the new Inventory of the Collection, which is not yet published, but wherever possible, I have given the old numbers as well, to facilitate their consultation in the catalogs which are presently for sale. Wherever there are no old numbers available, then I have at least given the room numbers.
- \*5. For several of statues of named kings, the makeup stripes are not shown in relief. However, they must nevertheless not be counted for statistical purposes.
- \*6. For instance, the statue of Horemheb next to Amun at Turin and others. Also, already on the statues of Sebekhotep in Paris (de Rougé, *Notice des mon.*, Numbers 16/17, page 15 ff.)
- †7. For instance, the colossal bust of Ramesses II in London and others.
- \*8. We are always speaking only of the stripes on the upper part and the side part of the cloth. The regular pleating of those cloths falling over the chest are not considered here.
- †9. With 3 and 4, we have another indication of the criteria of the Middle Kingdom, namely the rounding of the front horizontal edge of the seat.
- ‡10. See Golenischeff in *Recueil de Travaux* (1893), pages 131 ff.
- \*11. See Mariette in *Athenaeum Français* (1855), page 392.

\*12. The beard, which [ John] Perring found ([Howard Vyse,] *Operations at Giza*, vol. 3, between pages 108 and 109), is one made out of ashlar afterward cemented onto it, probably in the New Kingdom. It is an added, braided divine beard which the Sphinx only received when he was changed from one of the kings into a god. Herr Sethe has pointed out to me that the Sphinx was viewed erroneously by the Egyptians as an image of Harmachis. Originally, every sphinx was only the depicted king shown as a lion.

†13. The expression . . . [hieroglyphics] . . . (LD. III 68 Z. 7) could also mean: “The Sphinx with the Khepra,” and also on the stela . . . [hieroglyphics] . . . (*op. cit.*, Z. 11) “the sand is rising over me” probably refers only to the divine image in front of the chest, because the back and the head of the Sphinx were probably never covered with sand; however when it talks about . . . [hieroglyphics] . . . (*op. cit.*, Z.8) “the shadow of this great god,” one cannot really see a reference to a king even though it could be inferred according to the words, because one would expect to see the name of that king. So already they here thought of the Sphinx as a god.

‡14. See the figure LD. III, 68

§15. See the stela of Ramesses II. ([ John] Perring and [Howard] Vyse, *op. cit.*, vol. 3, page 117).

\*16. The east side and the southeast corner of it are today still visible, the west side is given by Mariette (*Mastabas*, page 551). This particular wall could already have existed in the New Kingdom, at least the representation of the Sphinx on the stela of Thutmosis IV (LD. III, 68), where the Sphinx figure is shown to be apparently lying on a building, according to the Egyptian laws of perspective, can also be interpreted in such a way that the Sphinx figure is inside a building open at the top, meaning this particular circular brick wall.

†17. See [ John] Perring and [Howard] Vyse, *op. cit.*, vol. 3, pages 110 and 113.

‡18. The fact that Herodotus never mentioned the Sphinx, however, is not so much because of it being covered by sand, because the head has never been covered completely, but the reason of its rather hidden location. You can only see the Sphinx from very few vantage points in the necropolis—actually, only from the very closest surrounding.

# ENDNOTES

## Chapter 1. Sphinx Obsession

1. Imam Marzouk, Amin Hussein, and Ali Gharib, "Underground Structure of Sphinx Area Deduced from Shallow Seismic Refraction Data," in *The First International Symposium on the Great Sphinx, Book of Proceedings* (Cairo: Egyptian Antiquities Organization Press, 1992), 119–28.
2. Ali Helmi Moussa and Lambert T. Dolphin, *Applications of Modern Sensing Techniques to Egyptology* (Menlo Park, Calif.: Stanford Research Institute International, 1977), 31.
3. Ibid., 64–67.
4. Mary Hamilton, *Incubation: Or the Cure of Disease in Pagan Temples and Christian Churches* (London: 1906), 99.
5. Diodorus the Sicilian, *The Historical Library of Diodorus the Sicilian*, translated by G. Booth (London: 1700), book 1, chapter 2, p. 11.
6. *Diodorus Siculus*, translated by C. H. Oldfather (New York: Loeb Classical Library, Harvard University Press, 1933), vol. 1, p. 81 (book 1, 25, 2–6).
7. Zahi Hawass and Mark Lehner, "The Passage Under the Sphinx," in *Hommages á Jean Leclant*, vol. 1 (Paris: Institut Français d'Archéologie Orientale, 1994), 201–216.
8. Zahi Hawass, *The Secrets of the Sphinx: Restoration Past and Present* (Cairo: The American University in Cairo Press, 1998), 13. This booklet is in both English and Arabic, and the English section is only thirty-four pages long. Lal Gauri's work is described in this booklet.
9. Paul Jordan, *Riddles of the Sphinx* (New York: New York University Press, 1998).
10. Johann Helffrich [ Johannes Helfricus], *Kurtzer und warhafftiger Bericht, von der Reis aus Venedig nach Hierusalem, von dannen in Aegypten . . .* (Brief and Genuine Account of a Journey from Venice to Jerusalem, and Thence to Egypt . . .) (Leipzig, 1579). Reprinted Leipzig, 1589. This work was also reprinted in both 1584 and 1609 in a folio collection of German travelers' accounts of journeys to the Holy Land, edited by S. Feyerabend.
11. Hawass and Lehner, "Passage Under the Sphinx," 201–2.
12. Ibid., 202.
13. K. Kleppisch, *Die Cheopspyramide ein Denkmal mathematischer Erkenntnis* (The Pyramid of Cheops: A Monument of Mathematical Knowledge) (Leipzig, 1921).
14. Hawass and Lehner, "Passage Under the Sphinx," 207–8.



15. Ibid., 213–15.
16. Ibid., 215.
17. Christiane Zivie-Coche, *Sphinx! La Père la Terreur: Histoire d'une Statue* (Paris: Éditions Noesis, 1997). English translation by David Lorton, *Sphinx: History of a Monument* (Ithaca, N.Y.: Cornell University Press, 2002).
18. Ibid., 40.
19. Hawass and Lehner, "Passage Under the Sphinx," 215.
20. The famous set of volumes entitled *Description de l'Égypte ou recueil des observations et des recherches qui ont été en Égypte pendant l'expédition de l'armée française* (*Description of Egypt, or, Collection of the Observations and Researches Which Were Carried Out in Egypt During the Expedition of the French Army*) (Paris, 1816).
21. Howard Vyse, *Operations Carried On at the Pyramids of Gizeh in 1837*, vol. 2B, originally published in London in 1840, ring-bound photographic reprint by ECA Associations, Chesapeake, N.Y., 1990, p. 287, note 1, in the appendix section.
22. James Bonwick, *Pyramid Facts and Fancies* (London, 1877), 106.
23. J. A. St. John, *Egypt and Nubia* (London, 1845), 131–34.
24. Count de Forbin, *The Travels in Egypt: Being a Continuation of the Travels in the Holy Land, in 1817–1818* (London, 1819).
25. *Voyage en Égypte du Père Antonius Gonzales, 1665–1666*, translated from the Dutch and annotated by Charles Libois, French Institute at Cairo, volume XIX (in two parts) of series of *Voyages en Égypte*, part I, p. 145.
26. John Lloyd Stephens, *Incidents of Travel in Egypt, Arabia Petraea, and the Holy Land*, Victor Wolfgang von Hagen, ed. (Norman: University of Oklahoma Press, 1970), 38.
27. Anonymous, "Observations Relating to Some of the Antiquities of Egypt, from the Papers of the Late Mr. Davison. Published in Walpole's Memoirs, 1817." *Quarterly Review* XIX (April and December 1818): 418.
28. Edward Daniel Clarke, *Travels in Various Countries of Europe, Asia and Africa*, vol. III, part the Second (London, 1814), 127–28.
29. William Hamilton, *Remarks on Several Parts of Turkey. Part 1. Aegyptiaca: Or, Account of the Antient and Modern State of Egypt* (London, 1809), 329–30.
30. Selim Hassan, *The Great Sphinx and Its Secrets: Historical Studies in the Light of Recent Excavations* (Cairo, 1953), 223.
31. Sir Peter le Page Renouf, *The Life-Work of Sir Peter le Page Renouf*, vol. 4, *The Book of the Dead. Translation and Commentary* (Paris and Leipzig, 1907), 97.
32. Sir E. A. Wallis Budge, *The Book of the Dead*, 2nd ed. (London, 1928), 173–74.

1. F[ather] Vansleb [Wansleben, Johann Michael], *The Present State of Egypt*, translated by M. D., from the German *Beschreibung von Aegypten* (London, 1678).
2. H. E. G. Paulus, ed., *Sammlung der merkwuerdisten Reisen in den Orient* ( Jena, 1794, reprinted 1803).
3. *Ibid.*, 115.
4. Vansleb, *Present State of Egypt*, 88.
5. *The Travels of Monsieur de Thevenot into the Levant* (London, 1687), translation of *Relation d'un voyage fait au Levant* (Paris, 1664–84).
6. Paulus, *Reisen in den Orient*, 208–9. The German text is as follows: “Da er hinterwaerts eine Höhlung unter der Erde hat, deren Breite der Höhe des Kopfs angemessen ist, in welche ich durch eine daselbst befindliche Oefnung hinein sah, and die zu nichts anders gedient haben kann als den Körper eines Todten hineinzustecken.”
7. Pietro della Valle, *Les fameux voyages de Pietro della Valle*, vol. 1 (Paris, 1664), p 228. This work is the French translation of the Italian original, *Viaggi di Pietro della Valle*.
8. Edward Melton, *Zee-en Land-Reizen; door Egypten, West-Indien, Perzien, Turkyen, Oost-Indien* (Amsterdam, 1681 and 1702).
9. *Ibid.*, 1702 ed., 51.
10. Kathleen A. Pickavance, “The Pyramids of Snofru at Dashur: Three Seventeenth-Century Travellers,” *Journal of Egyptian Archaeology* 67 (1981) 136–42.
11. Wood, Anthony, *Athenae Oxoniensis* (London, 1721)
12. Ellis Veryard, *An Account of Divers Choice Remarks Taken in a Journey Through Egypt . .* (London, 1701).
13. *Ibid.*, 298
14. Guido Pancirollo, *The History of Many Memorable Things Lost, Which Were in Use Among the Ancients: And an Account of Many Excellent Things Found, Now in Use Among the Moderns, Both Natural and Artificial* (London, 1715, and reissued in 1727). I am fortunate to own a copy of this rare book.
15. *Ibid.*, 107.
16. Thomas Shaw, *Travels, or Observations Relating to Several Parts of Barbary and the Levant* (Oxford, 1738).
17. *Ibid.*, 368–69.
18. *Ibid.*, 374–75.
19. Charles Thompson, *Travels Through Turkey in Asia, the Holy Land, Egypt, and Other Parts of the World* (London, 1754).
20. *Ibid.*, vol. 2, 143–44.
21. Richard Pococke, *A Description of the East and Some Other Countries*, 2 vols. (Folio, London, 1743–45),

22. British Library, Add. MSS. 22,978–22,998.
23. Letter 26 to His Mother, dated March 3, 1738/39 [1739 new style, with January 1 being New Year's Day], from the British Library, Add. MS. 22,998, f. 67
24. Pococke, *Description of the East*, vol. 1, 46.
25. “Frederick Lewis” Norden, *Travels in Egypt and Nubia*, translated from the original and enlarged by Peter Templeman, 2 vols. (Folio, London, 1757).
26. *Ibid.*, vol. 1, p. 80, for Norden's own comments, and p. 76 for the quote from Pococke.
27. Colonel Coutelle, “Observations sur les pyramides de Gyzeh,” in *Description de l'Égypte*, vol. 2 (Paris, 1818), 52–53.
28. Joseph Grobert, *Description des pyramides de Ghize* (Paris, 1801), 31–34.
29. Edward Daniel Clarke, *Travels in Various Countries of Europe, Asia and Africa*, 3 vols. (London, 1810–23). “Part the Second. Greece, Egypt, and the Holy Land, Section the Second,” vol. III (1814), 127–28. Clarke's further remarks on the Sphinx, which contain an interesting discovery regarding its ancient coloring, are on p. 145.
30. William Hamilton, *Remarks on Several Parts of Turkey. Part 1. Aegyptiaca: Or, Account of the Antient and Modern State of Egypt* (London, 1809), 329–30. Hamilton's last visit seems to have been in 1801, a mere three years after the clearance described by Grobert.
31. British Library, Add. MS. 25,619, f. 32.
32. Anonymous, “Observations Relating to Some of the Antiquities of Egypt, from the Papers of the Late Mr. Davison. Published in Walpole's Memoirs. 1817.” A review of the aforesaid publication in *Quarterly Review* 19 (April and December 1818): 418. Henry Salt's expenditures on the clearance of the Sphinx are mentioned on p. 418. “The expenses incurred by all these operations amounted to about 18,000 piastres, a share of which was contributed by Mr. Salt and two or three other gentlemen, who liberally engaged that the disposal of whatever might be discovered should be let wholly to Mr. Caviglia; and he, on his part, generously requested that every thing might be sent to the British Museum, as a testimony of his attachment to that country, under the protection of whose flag he had for many years navigated the ocean.” See also *Quarterly Review* 19, no. 38 (July 1818): 391.
33. *Ibid.*, 418.
34. Christian Josias Freiherr [Baron] von Bunsen, *Egypt's Place in Universal History: An Historical Investigation in Five Books*, trans. Charles H. Cottrell (London, 1848).
35. “Excavations of Monsieur Mariette at the Great Sphinx,” *Athenaeum Français: Révue universelle de la littérature, de la science et des beaux-arts* 4 (1855): 391–92.
36. Patricia Usick and Deborah Manley, *The Sphinx Revealed: A Forgotten Record of Pioneering Excavations* (British Museum Research Publication Number 164, British Museum Press, London, 2007).
37. *Ibid.*, 63, column a.
38. *Ibid.*, 65, column b.



39. Ibid., 67, column b.
40. Ibid., sketch 41 on p. 42.
41. Auguste Mariette, "Letter to Viscount E. [Emmanuel] de Rougé concerning the Excavations Made in the Vicinity of the Great Sphinx of Giza," in G. Maspero, ed., *Bibliothèque Égyptologique*, vol. 18 (Paris, 1904), 128. Reprinted from the *Athenaeum Français: Revue universelle de la littérature, de la science et des beaux-Arts* 3, no. 4 (Saturday 28 January 1854): 82–84. This and another letter from Mariette were read by E. de Rougé to the Academy of Inscriptions at the meeting of 24 March 1964; compare *Mémoires de l'Académie des Inscriptions*, vol. XX, 1st part, p. 96.
42. Ludwig Borchardt, "Über das Alter des Sphinx bei Giseh" ("Concerning the Age of the Sphinx at Giza"), in *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin (Report of the Proceedings of the Royal Prussian Academy of Sciences at Berlin), Sitzung der Philosophisch-Historischen Classe (Proceedings of the Historic-Philosophical Class)*, vol. XXXV (1897), 752–60.
43. Ibid., 759.
44. Ibid., 759–60.
45. Selim Hassan, *The Great Sphinx and Its Secrets. Historical Studies in the Light of Recent Excavations*, vol. 8 of his *Excavations at Giza* series, covering the years 1936–37 (Cairo: Government Press, 1953), 158–60.
46. Ibid., 160.
47. Robert Temple, *The Crystal Sun: Rediscovering a Lost Technology of the Ancient World* (London: Century, 2000).
48. Ali Helmi Moussa and Lambert Dolphin, *Applications of Modern Sensing Techniques to Egyptology* (Ain Shams University, Cairo, National Science Foundation, Washington, D.C., and SRI International, Menlo Park, Calif. [it is not clear which is the actual place of publication, and it appears that the booklet was simultaneously published by all three entities]: September 1977).
49. Ibid., 13.
50. Ibid., 64–67.
51. Lal Gauri, "Weathering and Preservation of the Sphinx Limestone," in Feisal A. Esmael, ed., *The First International Symposium on the Great Sphinx: Book of Proceedings* (Cairo, 1992), 46–47.
52. Mark Lehner, "Documentation of the Sphinx," in *ibid.*, figure 10, p. 92.
53. Robert Bauval, *Secret Chamber* (London: Century, 1999). Simon Cox is credited within the book as the author of appendix 4 and thanked in the acknowledgments for "his help in the editorial work," but I understand from Cox that he actually wrote part 1 of the book. I therefore view the book as having two authors.
54. Ibid., 185–86.
55. Mark Lehner, *The Egyptian Heritage* (Virginia Beach, Va.: ARE Press, 1974).
56. Bauval and Cox, *Secret Chamber*, 174–98.

### Chapter 3. An Amazing Survival

1. Anonymous, "Antiquities of Egypt," *Quarterly Review* 19, no. 38 (July 1818): 391–424. The full title heading of the article is: "Observations Relating to Some of the Antiquities of Egypt, from the Papers of the Late Mr. Davison. Published in [Robert] Walpole's Memoirs." It is important to realize that it is Robert Walpole, not Horace Walpole, whose memoirs are referred to here; Horace Walpole was the more famous author of *Memoirs*, and initially I was confused by this. The Mr. Davison referred to is the discoverer of "Davison's Chamber" in the Great Pyramid. The account about Caviglia's excavations at the Sphinx has nothing whatsoever to do with either Davison or Walpole, and if one were not told, one would have not the slightest idea that they occur in an article purporting to be a review of quite another book in which the Sphinx is not even mentioned. This was the eccentric way in which the *Quarterly Review* occasionally acted as a forum for material only vaguely related to the subject of a "review." The reference for the Walpole/Davison material is: Robert Walpole, *Memoirs Relating to European and Asiatic Turkey, Edited from Manuscript Journals* (London, 1817): pp. xx–xxi and 345–82. The material published by Walpole consisted of extracts from the manuscript diaries of Nathaniel Davison and letters found among his papers, which were made available to Walpole by Davison's widow, who lived at that time at Alnwick, Northumberland, and by Davison's nephew, Dr. Yelloly, of Finsbury Square, London. Davison died in 1809. I am not aware whether the manuscripts of Davison still exist, but I have never come across them. Perhaps somebody should make a search for them. Davison did very important work at the Great Pyramid and elsewhere, and his papers would be of the greatest importance to Egyptology. He counted and measured all the tiers of stone composing the Great Pyramid, and Davison's Chamber above the King's Chamber in the Great Pyramid is named after him, as he was its discoverer.
2. Ibid., 416
3. Anonymous, "Account of the Recent Discoveries in Egypt Respecting the Sphinx and the Great Pyramid," *The Edinburgh Philosophical Journal* 1 (June to October 1819): 88–96 (the quotation is from p. 95).
4. *Quarterly Review*, "Antiquities of Egypt," 410.
5. Selim Hassan, *The Great Sphinx and Its Secrets. Historical Studies in the Light of Recent Excavations* (Cairo: Government Press, 1953), 92–93. This large book is not the same as Hassan's earlier, smaller, and much briefer book *The Sphinx: Its History in the Light of Recent Excavations* (Cairo: Government Press, 1949). In notes I shall call the former *Great Sphinx* and the latter *Sphinx*. A much better edition of *Sphinx* appeared in French. It was in a larger format with much clearer illustrations. It is Selim Hassan, *Le Sphinx: Son histoire a la lumière des fouilles récente*, Cairo, 1951. We shall call this *Le Sphinx*.
6. Robert Temple, *The Crystal Sun: Rediscovering a Lost Technology of the Ancient World* (London: Century, 2000).
7. Hassan, *Sphinx*, 30.

8. Ibid., 25.
9. Herbert Rieke, ed. and contributor, *Beiträge zur Ägyptischen Bauforschung und Altertumskunde*, Heft [vol.] 10, Wiesbaden, 1970. The illustration is Plan 4, though it is unnumbered. It is unclear whether it is meant to be part of Rieke's portion of this volume, "Der Harmachistempel des Chefren in Giseh," or that written by Siegfried Schott, "Ägyptische Quellen zum Plan des Sphinxtempels." (I should add by way of explanation that although Schott calls the Sphinx Temple the Sphinx Temple, Rieke calls it the Harmachis Temple. These two names are used in the same volume!)
10. Ludwig Borchardt, "Über das Alter des Sphinx bei Giseh" ("Concerning the Age of the Sphinx at Giza"), in *Sitzungsberichte der Preussischen Akademie der Wissenschaften*, vol. 8, Berlin, July 1897.
11. Hassan, *Great Sphinx*, 158–60.

## Chapter 4. The Face of the Sphinx

1. André Dessenne, *Le Sphinx: Étude iconographique (The Sphinx: An Iconographic Study)* (Paris: Bibliothèque des École Françaises d'Athènes et de Rome, E. de Boccard, 1957).
2. Ibid., 14.
3. Christiane Zivie-Coche, *Sphinx: History of a Monument*, trans. from the French by David Lorton (Ithaca, N.Y.: Cornell University Press, 2002), 5. This small book deals only with Egypt, from the Old Kingdom through to the Greco-Roman period.
4. Rainer Stadelmann, "Royal Tombs from the Age of the Pyramids," a chapter in the profusely illustrated anthology *Egypt: The World of the Pharaohs*, Régine Schulz and Matthias Seidel, eds. (n.l.: Könemann Publishers, n.d.), 75.
5. Ludwig Borchardt, "Über das Alter des Sphinx bei Giseh" ("Concerning the Age of the Sphinx at Giza"), in *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin (Report of the Proceedings of the Royal Prussian Academy of Sciences at Berlin), Sitzung der philosophisch-historischen Classe (Proceedings of the Historic-Philosophical Class) XXXV* (1897): 752–60.
6. Harco Olger Willems, *The Coffin of Heqata: A Case Study of the Egyptian Funerary Culture of the Early Middle Kingdom*, thesis for the degree of doctor of letters at the Rijksuniversiteit Groningen, Groningen, Netherlands, 1994, vol. 2, p. 474.
7. Ibid., 484, note bv.
8. A lengthy discussion of these matters, though somewhat confusing, is found in *ibid.*, vol. 1, 262–70.
9. Ibid., vol. 1, 193.
10. E. A. Wallis Budge, *A History of Egypt*, vol. 3, *Egypt Under the Amenemhats and Hyksos*, in the series *Books on Egypt and Chaldaea* (London: Kegan Paul, Trench, Trubner & Co., 1902), 70.
11. Selim Hassan, *The Great Sphinx and Its Secrets. Historical Studies in the Light of Recent Excavations*, vol. 8 of his *Excavations at Giza* series, covering the years 1936–37 (Cairo:



Government Press, 1953).

12. Wallis Budge, *History of Egypt*, 43–48.

13. *Ibid.*, 58

14. Herodotus, *The Histories*, Book II, 149, Aubrey de Sélincourt, trans. (Harmondsworth, Middlesex, U.K.: Penguin Books, 1971), 161.

15. Wallis Budge, *History of Egypt*, 69.

16. *Ibid.*, 71.

17. Biri Fay, *The Louvre Sphinx and Royal Sculpture from the Reign of Amenemhat II* (Mainz, Germany: Verlag Philipp von Zabern, 1996).

18. Jaromir Malek, “The Annals of Amenemhet II,” in *Egyptian Archaeology* (2) (1992): 18, Egypt Exploration Society, London.

19. Fay, *Louvre Sphinx*, 54–55.

20. Robert Temple, *The Sirius Mystery*, new expanded edition (London: Century Books, 1998), chapter 1.

## Chapter 5. The Sphinx as Anubis

1. Mark Lehner, *The Complete Pyramids* (London: Thames & Hudson, 1997), 128.

2. Roger Highfield, “Genes Prove Hounds Were Never Pharaoh’s Best Friend,” in the *London Telegraph*, 21 June 2004, reporting a study published in *Science* magazine by a team from the Fred Hutchinson Cancer Research Center of Seattle, Washington.

3. Alberto Bianchi, “On the Presence of the Wild Dog in Ancient Egyptian Iconography,” *Discussions in Egyptology* 42 (1998): 10.

4. *Ibid.*, 9.

5. *Ibid.*, 8–9

6. Lehner, *Complete Pyramids*, 128–29.

7. Zahi Hawass, “History of the Sphinx Conservation,” in *Books of Proceedings of the First International Symposium on the Great Sphinx* (Cairo: Egyptian Antiquities Organization Press, 1992), 171–72.

8. Selim Hassan, *The Great Sphinx and Its Secrets. Historical Studies in the Light of Recent Excavations*, vol. 8 of his *Excavations at Giza* series, covering the years 1936–37 (Cairo: Government Press, 1953), 114.

9. Richard A. Parker, Jean Leclant, and Jean-Claude Goyon, *The Edifice of Taharqa by the Sacred Lake of Karnak* (Providence, R.I.: Brown University Press, 1979), ix.

10. Terence Du Quesne, *The Jackal Divinities of Egypt: I, From the Archaic Period to Dynasty X* (London: Da’th Scholarly Services, Darengo Publications, 2005), 43, 102, 108, and the discussion of the title *Khenti-ta-Djeser*, “Foremost of the Secluded Land,” on pp. 154–57

11. Ibid., 220–21.
12. Hassan, *Great Sphinx*, 114.
13. Ibid., 116–17.
14. Lehner, *Complete Pyramids*, 50.
15. Robert Temple, *The Crystal Sun: Rediscovering a Lost Technology of the Ancient World* (London: Century, 2000).
16. Alexander Badawy, “Zoomorphic Shrines in Egypt and India,” *The Journal of the Society of Architectural Historians* XVIII, 1 (March 1959), 27–29.
17. Ibid., 27.
18. Alexander Badawy, *A History of Egyptian Architecture*, vol. I (London: Histories & Mysteries of Man Ltd., 1990), 34–35.
19. Hassan, *Great Sphinx*, 60.
20. Ibid., 61.
21. Terence Du Quesne, *Anubis and the Spirits of the West* (Thame, Oxfordshire: Darengo Publications, 1990), 10 and 16, note 34. This publication is remarkably rare, having had a tiny printing, and is absent from most libraries. I am fortunate to have acquired a copy, which greatly astonished Terence when I told him, as he has only one copy of it himself.
22. Harco Olger Willems, *The Coffin of Heqata. A Case Study of the Egyptian Funerary Culture of the Early Middle Kingdom*, thesis for the degree of doctor of letters at the Rijksuniversiteit Groningen, Groningen, Netherlands, 1994, vol. 2, 456.
23. Terence DuQuesne, *Jackal at the Shaman’s Gate: A Study of Anubis Lord of Ro-Setawe* (Oxfordshire: Darengo Publications, 1991).
24. Ibid., 9–21.
25. Another meaning of the word is “rich brocade,” but that has nothing to do with our concerns here. It was the origin of the structural meaning, because European baldachins were originally made of such brocade.
26. R. O. Faulkner, trans., *The Ancient Egyptian Pyramid Texts* (Oxford: Clarendon Press, 1998), 144.
27. Ibid., 235.
28. Ibid., 144.
29. Ibid., 271.
30. Ibid., 291.
31. Deborah Sweeney, “Egyptian Masks in Motion,” *Göttinger Miszellen* 135 (1993) 101–104.
32. Terence Du Quesne, “Concealing and Revealing: The Problem of Ritual Masking in Ancient Egypt,” *Discussions in Egyptology* 51 (2001) 5–21.
33. Du Quesne, *Jackal Divinities*, 97–98.

34. Ibid., 90.
35. William Kelly Simpson, *The Mastabas of Kawab, Khafkhufu I and II* (Boston: Museum of Fine Arts, 1978), 9.
36. Ibid., 10.
37. Ibid., 1.
38. Ibid., 6
39. Dows Dunham and William Kelly Simpson, *The Mastaba of Queen Mersyankh III* (Boston: Museum of Fine Arts, 1974), 8–9.
40. Du Quesne, *Jackal Divinities*, 90, 96.
41. See, for example, Ann Macy Roth, *A Cemetery of Palace Attendants, Giza Mastabas*, vol. 6 (Boston: Museum of Fine Arts, 1995), 35, 89, 103, 126, 130, 137, 146, 164–65
42. Ibid., 160.
43. R. O. Faulkner, trans., *The Ancient Egyptian Coffin Texts*, vol. 3 (Warminster, England: Aris & Phillips, 1978), 15.
44. Ibid., vol. 2, 212.
45. Ibid., vol. 1, 236.

## Chapter 6. Sphinx Island

1. R. A. Schwaller de Lubicz, *Sacred Science. The King of Pharaonic Theocracy*, trans. André and Goldian Vanden Broeck (Rochester, Vt.: Inner Traditions, 1982).
2. Ibid., 96
3. Zahi Hawass, “History of the Sphinx Conservation,” in *The First International Symposium on the Great Sphinx, Book of Proceedings* (Cairo: Egyptian Antiquities Organization Press, 1992), 181.
4. John Anthony West, “Metaphysics by Design: Harmony and Proportion in Ancient Egypt,” *Second Look* 1, 8 ( June 1979): 2–5.
5. John Anthony West, *Serpent in the Sky: The High Wisdom of Ancient Egypt* (London: Wildwood House, 1979). The American edition was published by Harper & Row in New York. My friend Oliver Caldecott, joint head of Wildwood House, was the person who took the book for England. He had seen the *Second Look* article.
6. Mark Lehner, *The Complete Pyramids* (London: Thames & Hudson, 1997), 126.
7. Richard Pococke, *A Description of the East and Some Other Countries* (Folio, London, 1743–5, vol. 1), 46.
8. Joseph Needham and Ling Wang, *Science and Civilization in China*, vol. 4, part 2, *Mechanical Engineering* (Cambridge, U.K.: Cambridge University Press, 1965, 331–32)
9. Ibid., 331–34, incorporating footnotes c and e on p. 334.

10. Ibid., 352, 356
11. Jack Finegan, *Hidden Records of the Life of Jesus* (Philadelphia and Boston: Pilgrim Press, 1969), 83. Finegan believes he has identified the ridge. For the Strabo passage, see Strabo, Casaubon 806 (Finegan gives the wrong reference of 86), in *The Geography of Strabo*, translated by Horace Leonard Jones, Loeb Library Series (Cambridge, Mass.: Harvard University Press, 1988), or see next endnote.
12. Strabo, *The Geography*, trans. H. C. Hamilton and W. Falconer, 3 vols (London: George Bell and Sons, 1881) (book 17, 1, 30; Casaubon 806).
13. Selim Hassan, *The Great Sphinx and Its Secrets. Historical Studies in the Light of Recent Excavations*, vol. 8 of his *Excavations at Giza* series, covering the years 1936–37 (Cairo: Government Press, 1953), 31.
14. Ibid., 29
15. Ibid., fig. 10.
16. Charles Leonard Irby and James Mangles, *Travels in Egypt and Nubia, Syria, and Asia Minor During the Years 1817 and 1818* (London, 1823); photographic reprint (London: Darf Publishers Limited, 1985), 157–58.
17. Paul Jordan, *Riddles of the Sphinx* (New York: New York University Press, 1998), 14–15.
18. Robert M. Schoch, *Voices of the Rocks: A Scientist Looks at Catastrophes and Ancient Civilizations* (London: Thorsons, 2000), 39. (The book was originally published in New York in 1999.)
19. Ibid., 44.
20. Ibid.
21. Mark Lehner, *The Complete Pyramids* (London: Thames & Hudson, 1997), 107.
22. Ibid., 106
23. Schoch, *Voices of the Rocks*, 48.
24. Ibid., 40.
25. R. O. Faulkner, trans., *The Ancient Egyptian Pyramid Texts* (Oxford: Clarendon Press, 1998), 40.
26. James P. Allen, *Genesis in Egypt: The Philosophy of Ancient Egyptian Creation Accounts*, Yale Egyptological Studies 2 (New Haven, Conn.: Yale University Press, 1988), 25.
27. K. Lal Gauri and Jayanta K. Bandyopadhyay, *Carbonate Stone: Chemical Behavior, Durability, and Conservation* (New York: John Wiley & Sons, 1999)
28. K. Lal Gauri, John J. Sinai, and Jayanta K. Bandyopadhyay, “Geologic Weathering and Its Implications on the Age of the Sphinx,” *Geoarchaeology: An International Journal* 10, no. 2 (1995): 119–33.
29. Ibid., 132.
30. Gauri and Bandyopadhyay, *Carbonate Stone*, 248.



31. For Belzoni's description of his rediscovery and of the Arabic writing he found inside that proved the previous discovery by the Arabs, see the lengthy account in his book *Narrative of the Operations and Recent Discoveries Within the Pyramids, Temples, Tombs, and Excavations, in Egypt and Nubia*. My copy is the second edition, published by John Murray, London, 1821. The first edition appeared the previous year, in 1820. Most of Belzoni's engravings were published in a separate atlas volume, and few of these volumes survive intact, as they have mostly been dismembered and their prints sold off separately by dealers wishing to optimize their profits.
32. Herodotus, *The Persian Wars*, Book II, 127, trans. A. D. Godley, vol. 1 (Boston: Harvard University Press, Loeb Classical Library, 1960), 429–31.
33. *Ibid.*, Book II, 124, vol. 1, 425–27.
34. *Ibid.*, Book II, 147, vol. 1, 455.
35. E. A. Wallis Budge, *The Egyptian Heaven and Hell*, vol. 3 (London: Kegan Paul, 1905), 131–33.
36. Alexandre Piankoff, trans., *The Pyramid of Unas*, Bollingen Series XL 5 (Princeton, N.J.: Princeton University Press, 1968), 63. The quotation is from Utterance 217, line 157.
37. Alexandre Piankoff, *The Tomb of Ramesses VI*, vol. 1, Bollingen Series XL:1 (New York: Pantheon Books, 1954), *Texts*, 47.
38. *Ibid.*, 69.
39. *Ibid.*, 96.
40. *Ibid.*, 105.
41. *Ibid.*, 120.
42. *Ibid.*, 121.
43. Robert Temple, *He Who Saw Everything: A Verse Translation of the Epic of Gilgamesh* (London: Rider, 1991), 130 (the text) and 137 (the footnote).
44. Faulkner, *Pyramid Texts*, 188–89.
45. *Ibid.*, 76–77.
46. *Ibid.*, 91.
47. *Ibid.*, Utterance 515, 190.
48. E. A. Wallis Budge, *Osiris and the Egyptian Resurrection*, vol. 2 (London: Philip Lee Warner, 1911), 323.
49. *Ibid.*
50. *Ibid.*, 288.
51. *Ibid.*, 277.
52. *Ibid.*, 290.
53. *Ibid.*, 289.
54. Terence Du Quesne, *The Jackal Divinities of Egypt* (London: Darengo Publications, 2005), 411.



55. Ibid., 299.
56. R. O. Faulkner, trans., *The Ancient Egyptian Coffin Texts*, vol. 2 (Warminster, England: Aris & Phillips, 1977), 163.
57. Ibid., vol. 1, 22.
58. Ibid., vol. 1, 196.
59. Ibid., 217.
60. Ibid., 261.
61. Ibid., 265.
62. Ibid., 270.
63. Ibid., vol. 3, 184–89.
64. Ibid., 186, Spell 1171.
65. Alexandre Piankoff, trans., *The Shrines of Tut-Ankh-Amon*, 2 vols., Bollingen Series XL:2 (New York: Pantheon Books, 1955), 32.
66. Ibid., 58.
67. Ibid., 140.
68. Ibid., 60, 97, 137.
69. Ibid., 34.
70. Ibid., 75.
71. Ibid., 87.
72. Alexandre Piankoff, trans., *Mythological Papyri*, vol. 1, Bollingen Series XL 3 (New York: Pantheon Books, 1957), *Texts*, 99.
73. Peter le Page Renouf, *The Life-Work of Sir Peter le Page Renouf*, vol. 4, *The Book of the Dead: Translation and Commentary* (Paris and Leipzig, 1907), 237–38.
74. Faulkner, *Pyramid Texts*, 184.
75. Ibid., 185–86.
76. Hassan, *Great Sphinx*, 123.
77. “Observations relating to some of the Antiquities of Egypt, from the papers of the late Mr. Davison,” *Quarterly Review* XIX (April and December, 1818); London, 1819, pp. 391–424. (The reason for two dates with this reference is that the issues of the periodical were for 1818, but the bound edition of them came out in 1819 in volume form.) The original Greek inscription, entirely in capital letters, is faithfully reproduced on p. 411, and the transliteration into lowercase Greek, the Latin translation, and the English translation are all on p. 412. (These were all done by “Dr. Young.”)
78. Simplicius, *Epictetus His Morals, with Simplicius His Comment, Made into English from the Greek* by George Stanhope, London, 1694. I bought this book so long ago, from Quaritch’s

Catalogue 927, which I see from the price written inside and the catalog entry that I clipped and inserted in the book, that it only cost me £10 (although that was a lot then). My copy contains the hand corrections by the translator himself and seems to have been his own personal copy. The leather spine is plain, as he had no need to be told what it was when it was sitting on the shelf beside him. From the nature of Stanhope's corrections, I can see that he must have been irritated by some of the printer's errors, such as mistaking "which" for "when." But in those days, printers did have to struggle to read the handwriting of authors, and that was the cause of many typographical errors. Today, things are different, because so many people under the age of thirty lack the ability to spell correctly due to the collapse in effective teaching methods as a result of the intrusion of crazy political ideas into the educational field, combined with the decline of the print medium in this "I.T. Age," so that even if things are printed out perfectly clearly by the computer, many young people can no longer "read" them, as they simply do not "see" spelling anymore and have no way way of retaining it in their minds, which have not been trained to do so. Also, few young people read enough anymore for standardization of spelling to enter into the memory. And then there are the corrupting influences of abbreviated "texting" by thumb-messaging over handheld devices, so that spelling ends up being dictated by the movement capabilities of the human thumb, in disregard of the obvious fact that the human thumb is of an inferior status to the human mind, which should be making these decisions. In the twenty-first century, our society is thus reverting to spelling by sound rather than by convention established by the print medium, and has in that sense gone back to the lack of precise spelling characteristic of the seventeenth century. Who says there is such a thing as "cultural progress"? "Decline," on the other hand, requires no proof of its existence.

[79.](#) Ibid., 2.

[80.](#) See Robert Temple, *Oracles of the Dead* (Rochester, Vt.: Inner Traditions, 2004), for an account of my visit to an underground shrine of Persephone, goddess of the underworld. (This book was entitled *Netherworld* when it was first published in Britain in 2002.) See also the fifty-two-minute television documentary film that I wrote, produced, and presented, entitled *Descent into Hell*, which is shown from time to time on the National Geographic Channel. In one scene, I leave a traditional offering of a bough of mistletoe (brought from England) for Persephone in the very same niche where the fictional hero Aeneas is described as doing so in the *Aeneid* of Virgil. (Virgil was personally familiar with this underground sanctuary known as the Oracle of the Dead, at Baia.)

[81.](#) Hassan, *Great Sphinx*, 123. Selim Hassan chose to publish this modern prose version rather than to quote the even more old-fashioned verse translation that was published in 1818.

[82.](#) *Quarterly Review*, "Observations," p. 412.

[83.](#) Appendix volume (volume 3), plate E on p. 119. The translation is facing on p. 118.

[84.](#) Ibid., 118.

## Chapter 7. The Sphinx and the Giza Plan

1. This is a subject that I discussed in my earlier book *Open to Suggestion: The Uses and Abuses of Hypnosis* (England: Aquarian Press, 1989), 49–50, in the context of the evidence I presented

- about how people can still hear when they are in a state of coma or under an anesthetic on the operating table, a phenomenon known as “surgical memory.” The sense of hearing is the last to go when you die, and the Tibetans somehow knew this, and realized that shouting into the ears of someone who appears to be dead is not necessarily pointless at all, but may actually be helpful.
2. Erik Hornung, *The Ancient Egyptian Books of the Afterlife*, translated from the German by David Lorton (Ithaca, N.Y.: Cornell University Press, 1999), 32.
  3. E. A. Wallis Budge, *The Gods of the Egyptians*, vol. 4 (London: Methuen, 1904), 224.
  4. Margaret A. Murray, *The Osireion at Abydos*, Egyptian Research Account, Ninth Year, 1903 (London: Bernard Quaritch, 1904), 15. (This book has also been photographically reprinted by Histories & Mysteries of Man Ltd., London, 1989.)
  5. Hornung, *Books of the Afterlife*, 30.
  6. Alexandre Piankoff, *The Wandering of the Soul*, completed by Helen Jacquet-Gordon [after Piankoff’s death], vol. 6 of Piankoff’s series *Egyptian Religious Texts and Representations*, Bollingen Series 40: 6 (Princeton, N.J.: Princeton University Press, 1974). *The Book of Two Ways* is the first of three ancient Egyptian texts included in this volume.
  7. *Ibid.*, 14–17 and foldout plan at back of book.
  8. *Ibid.*, 14 and foldout plan at back of book.
  9. J. R. Harris, *Lexicographical Studies in Ancient Egyptian Minerals* (Berlin: Akademie-Verlag, 1961), 138
  10. *Ibid.*
  11. Piankoff, *The Wandering of the Soul*, vol. 6, 21 and foldout plan at back of book.
  12. I was present at the Eighth International Congress of Egyptologists in Cairo in 2000 when this discovery was announced. The paper was published in 2003: Jean-Yves Verd’hurt and Gilles Dormion, “New Discoveries in the Pyramid of Meidum” in Zahi Hawass, ed., *Egyptology at the Dawn of the Twenty-First Century: Proceedings of the Eighth International Congress of Egyptologists, Cairo, 2000*, vol. 1 (Cairo and New York: American University in Cairo Press, 2003), 541–46
  13. *Ibid.*
  14. *Ibid.*, 22.
  15. *Ibid.*, 23.
  16. Omm Sety and Hanny El Zeini, *Abydos: Holy City of Ancient Egypt* (Los Angeles, Calif.: L. L. Company, 1981), 176–78.
  17. Ahmed El-Sawy, “A New Discovery at the Sety I Temple in Abydos,” in Hawass, *Egyptology*, op. cit., vol. 1, 424–31.
  18. Strabo, *The Geography*, H. C. Hamilton and W. Falconer, trans., vol. 3 (London: George Bell and Sons, 1881), 249 (Book 17, 1, 33; Causabon 807).
  19. *Ibid.*, 250.



20. Sozomen, *Ecclesiastical History*, I, 14, Edward Walford, trans. (London: Bohns Library, 1855), 34.
21. Hero of Alexandria, *Pneumatics*, I, 38–39.
22. This strange expression may conceivably be a reference to a wall or slab of basalt, which, being black, is the color of charcoal. That is just my guess. However, no Egyptologist has ever discovered the name by which basalt was known to the ancient Egyptians. This strange fact is recorded by the leading expert on ancient Egyptian names for stones and minerals, J. R. Harris. He says of basalt: “No name is known.” (From Harris, J. R., *Lexicographical Studies in Ancient Egyptian Minerals*, Akademie-Verlag, Berlin, 1961, p. 94 ) Basalt largely ceased to be used after the Old Kingdom, but its occurrence in both building and statuary prior to 2200 BC was substantial. The fact that we do not know the ancient name for basalt means that references to it have probably been misunderstood in the texts, where it has doubtless been mentioned but not recognized. Hence, a reference to a “charcoal wall” might, for all we know, actually mean “a basalt wall,” or a common word meaning “black substance” might have been used as a general term for both charcoal and basalt. We need always to keep in mind our ignorance when dealing with matters concerning basalt in ancient Egypt. See figure 4 for an example in the Valley Temple, which is at Rostau.
23. Pliny, *Natural History*, Book XXXVI, 16, 76; D. E. Eichholz, trans., vol. 10 of Pliny (Boston: Loeb Classical Library, Harvard University Press, 1971), 61.
24. Piankoff, *Wandering of the Soul*, 23–36.
25. John Coleman Darnell, *The Enigmatic Netherworld Books of the Solar-Osirian Unity* (Fribourg: Academic Press, 2004), 99.
26. J. Gwyn Griffiths, *Plutarch's de Iside et Osiride* (Cardiff: University of Wales Press, 1970), 436–37; the mention of Sokar is on p. 437. Griffiths adds a curious detail that at the Island of Philae, the *redju* of Osiris that created the Nile was regarded as coming from his left leg. This is doubtless an esoteric reference with an important meaning. If Osiris was regarded as rising in the east at dawn (see discussion of this later in this chapter), then his left leg would be his southern leg. The god Ptah was conventionally described as being “south of his Wall.” These references to the cardinal directions are always significant. (See also the later discussion of the shadow on the south face of the Great Pyramid.)
27. *Ibid.*, 172–73 (first sentence of chapter 36 of Plutarch's treatise)
28. J. Zandee, *Death as an Enemy According to Ancient Egyptian Conceptions* (Leiden, The Netherlands: Brill, 1960), 57–58.
29. *Ibid.*, 58–59.
30. Andreas Winkler, “The Efflux That Issued from Osiris,” *Göttinger Miszellen* 211 (2006): 125–39.
31. J. Zandee, *Death as an Enemy According to Ancient Egyptian Conceptions* (Leiden, The Netherlands: Brill, 1960), 58.
32. Daniel Burnham, “Explorations into the Alchemical Idiom of the Pyramid Texts,” *Discussions in Egyptology* 60 (2004): 11–20.

33. E. A. Wallis Budge, *The Egyptian Heaven and Hell*, vol. 2 (London: Kegan Paul, 1905), 13–17.
34. *Ibid.*, 26
35. *Ibid.*
36. Murray, *Osireion at Abydos*, 17.
37. Marshall Clagett, *Ancient Egyptian Science*, vol. 1 (Philadelphia: American Philosophical Society, 1992), 474 and reference on p. 487 to “H. Altenmüller, ‘Toten-Literatur,’ 22. Jenseitsbücher, Jenseitsführer, *Handbuch der Orientalistik*, Abteilung 1, Vol. 1, Part 2, pp. 70–72,” but giving no date. I have not consulted this original reference but took the information from Clagett.
38. Peter Tompkins, *Secrets of the Great Pyramid* (New York: Harper & Row, 1971), 45–48
39. Robert Temple, *The Crystal Sun: Rediscovering a Lost Technology of the Ancient World* (London: Century, 2000).
40. John Taylor, *The Great Pyramid. Why Was It Built? And Who Built it?* (London: Longman Green, 1859), 19–20.
41. Tompkins, *Secrets of the Great Pyramid*, 70–72.
42. Euclid, *The Thirteen Books of Euclid’s Elements*, trans. Thomas Heath, vol. 2 (New York: Dover Publications, 1956, 2nd ed. reprint), 114.
43. *Ibid.*, 188
44. *Ibid.*, 267.
45. Alexander Badawy, *Ancient Egyptian Architectural Design: A Study of the Harmonic System*, Near Eastern Studies 4 (Berkeley and Los Angeles: University of California Press, 1965).
46. Badawy, *History of Egyptian Architecture*, (Berkeley and Los Angeles: University of California Press, 1968).

## **Chapter 8. The Golden Angle of Resurrection**

1. Else Christie Kielland, *Geometry in Egyptian Art* (London: Tiranti, 1955)
2. John Coleman Darnell, *The Enigmatic Netherworld Books of the Solar-Osirian Unity* (Fribourg: Academic Press, 2004), 297.
3. *Ibid.*
4. *Ibid.*, 365.
5. *Ibid.*, 477.
6. *Ibid.*, 341.
7. *Ibid.*, 348.
8. *Ibid.*, 276–77.
9. *Ibid.*, 365.

10. Ibid., 286
11. Ibid., 302–4.
12. Ibid., 291.
13. Ibid., 306–7.
14. Ibid., 309.
15. Ibid., 325.
16. Ibid., 318–19.
17. Ibid., 319–20.
18. Ibid., 320–21.
19. Ibid., 322.
20. Ibid., 325–26
21. Ibid., 328
22. Ibid., 357.
23. John Gwyn Griffiths, trans. and ed., *Plutarch, De Iside et Osiride (On Isis and Osiris)* (Cardiff: University of Wales Press, 1970), 209 (chapter 56, 374A, of the text) Because the Griffiths book is unfortunately extremely rare, I give the references to the Bohn and Loeb editions as well: C. W. King, trans., *Plutarch's Morals: Theosophical Essays* (London: George Bell, 1889); absorbed into Bohn's Classical Library with the takeover of Bell by Bohn, p. 49; Frank Cole Babbitt, trans., vol. 5 of *Plutarch's Moralia* (Cambridge, Mass : Harvard University Press, 1962), 135.
24. Ibid.
25. Ibid.
26. C. W. King, *The Gnostics and Their Remains* (London: Bell and Daldy, 1864), illustration facing p. 90.
27. There is apparently an extended modern account of this graffito in German by Klaus Parlasca, but I have not been able to find it, as it is published in a book compiled by another German author, and the reference I have is incomplete Parlasca apparently gives a bibliography to the extensive discussions of this graffito that have been published over many years Because this graffito is not a main subject of my book, I have cut short my research on it and leave it to others to pursue if they wish.
28. Alexandre Moret, “L’Influence du Décor Solaire sur la Pyramide” (“The Influence of Solar Decoration on the Pyramid”), 623–36, Institut Français d’Archéologie, Cairo, 1934, 29. Sylvie Cauville, *Dendara V–VI Traduction: Les Cryptes du Temple d’Hathor (The Crypts of the Temple of Hathor, Translation [of the Texts of, given in volumes V–VI of the French series, which published the texts in hieroglyphic form])*, volume 1, Peeters, Wilsele, Belgium, 2004.
29. Wolfgang Waitkus, *Die Texte in den unteren Krypten des Hathortempels von Dendera, Ihre Aussagen zur Funktion und Bedeutung dieser Räume (The Texts in the Subterranean Crypts of the Temple of Hathor at Dendera, Their Evidence as to the Function and Significance of These*

Chambers) (Mainz, Germany: Philipp von Zabern, 1997).

30. R. V. Lanson, *Dizionario di Mitologia Egizia* [*Dictionary of Egyptian Mythology*], reprint by Benjamins, Amsterdam, 1974, vol. 2, pp. 658–66 contains a discussion of Harsomtut, and plates CCXXXIX–CCXXXI referring to this contain depictions of the reliefs in the crypt, and show all the “snake aubergines.” The text is in Italian, with no translation into any other language.
31. Robert Ballard, *The Solution of the Pyramid Problem or, Pyramid Discoveries with a New Theory as to Their Ancient Use* (New York: John Wiley & Sons, 1882).

## About the Author

[Robert Temple](#) is visiting professor of the history and philosophy of science at Tsinghua University in Beijing; fellow of the Royal Astronomical Society; member of the Egypt Exploration Society, Royal Historical Society, Institute of Classical Studies, and the Society for the Promotion of Hellenic Studies; and visiting research fellow of the University of the Aegean in Greece. He is the author of 12 books, including *The Sphinx Mystery*, *The Sirius Mystery*, *Oracles of the Dead*, and *The Genius of China*. He wrote, produced, and presented the documentary film *Descent into Hell*, based upon his book, *Oracles of the Dead*, for National Geographic Channel. His translation of the Epic of Gilgamesh was staged at the Royal National Theatre in London in 1993. He resides in England with his wife, Olivia. They are joint translators of *Aesop: The Complete Fables*.

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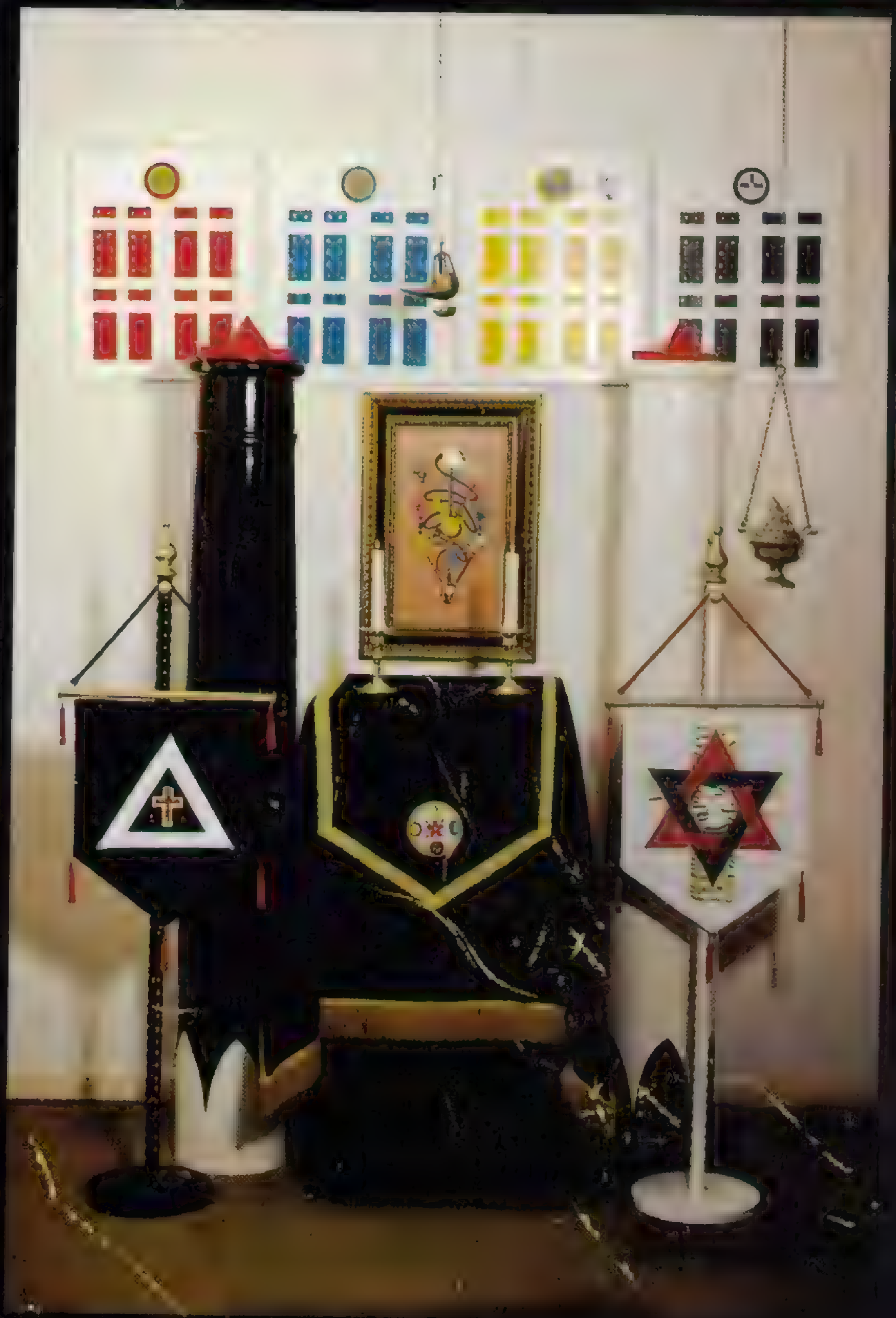
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# the Secret Temple



ROBERT WANG





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THE ROSE CROSS LAMEN



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THE AIR DAGGER



THE FIRE WAND



THE WATER CUP



THE EARTH PENTACLE





THE TEMPLE



THE ROBE

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## CONTENTS

1. Preface, 1

### PART I The Instruments

2. The Lotus Wand, 11
3. The Rose Cross Lamen, 19
4. The Sword, 29
5. The Fire Wand, 33
6. The Water Cup, 37
7. The Air Dagger, 41
8. The Earth Pentacle, 43

### PART II The Temple

9. The Temple, 51
10. The Altar, 55
11. The Lamp, 58
12. The Censer, 59
13. The Cross and Triangle, 61
14. The Pillars, 63
15. The Temple Diagram, 73
16. The Banners of the East and West, 79
17. The Enochian Tablets, 83
18. Robes, 89

*Notes on Consecration, 91*

*Recommended Reading, 91*



Dedicated to Israel Regardie,  
who has shed Light on the Path,  
for all of us.

### *Acknowledgments*

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# 1 / Preface

This is a practical book. It is intended for those who feel a natural inclination toward ritual, and who are willing to expend the special effort required to produce a full set of magical instruments and a personal Temple. The very act of developing the Wands, Cup, Tablets, etc., is a devotional one which may lead the student to an inner mainstream. It is a form of sacrifice.

The instruments and Temple described herein are those specified by the Hermetic Order of the Golden Dawn. They are, however, based on principles which have not varied over the centuries. Particular to the Golden Dawn is its emphasis on the four Elements, symbolized by the Wand, Cup, Dagger and Pentacle. These instruments represent the component parts of the personality, as is also represented by the five-pointed star of *Pentagram*. In this figure the fifth point is that of Spirit.

Those who ascribe to the methods taught by Aleister Crowley will experience few difficulties in adapting the materials in this book to his ritual practices, all of which grew from the practices of the Order of the Golden Dawn. Crowley was not very explicit, in his writings, about these instruments. In his *Equinox*, *Magick in Theory and Practice* and *Magick Without Tears* he discussed the subject without mention of the inscriptions to be placed on the instruments. But for those who possess the practical keys of the Golden Dawn, Crowley's work provides a dimension of insight which is unique.

His most useful advice is given in a letter to a friend, published in *Magick Without Tears*:

Let us consider what one can do with an ordinary house. . .

First of all, it is of immense advantage to have a room specially consecrated to the Work, never used for any other purpose, and never entered by any person other than yourself, unless it were another Initiate, either for inspection or in case you were working together.

The aura accumulates with the regularity and frequency of Use.

The first point is the Banishing: Everything is to be removed from the room which is not absolutely necessary to the Work. . . The walls should be 'self-coloured,' a neutral tint-green, grey or blue grey? — and entirely bare, unless you put up in the proper quarters, the proper designs, such as the 'Watch Towers.' . . . Next, your Circle. The floor ought to be 'Earth' green; but white will serve, or black (A Masonic carpet is not at all bad.) . . . The Altar must fit exactly the square of Tiphareth; it is best made as a cupboard; of oak or acacia, by preference. It can then be used to hold reserves of incense and other requisites.

Note that the height of the Altar has to suit your convenience. It is consequently in direct relation with your own stature; in proportion it is a double cube. This then determines the size of your circle; in fact the entire apparatus and furniture is a geometrical function of yourself. . . . Next, the Lamp. This may be of silver, or silver-gilt (to represent the Path of Gimel) and is to be hung from the ceiling exactly above the centre of the Altar. There are plenty of old church lamps which serve very well. The light is to be from a wick in a floating cork in a glass of olive oil. . . . It is really desirable to make this as near the 'ever burning Lamp of the Rosicrucians' as possible; it is *not* a drawback that this implies frequent attention.

Now for the Weapons!

*The Wand.* Let this be simple, straight and slim! Have you an Almond or Witch Hazel in your garden . . .? If so, cut (with the magic knife. . .) a bough, as nearly straight as possible, about two feet long. Peel it, rub it constantly with Oil of Abramelin. . .and keep wrapped in scarlet silk. Constantly I wrote, and meant it; rub it, when saying your mantra, to the rhythm of that same.

. . .*The Cup.* There are plenty of chalices to be bought. It should be of silver. . .

*The Sword.* The ideal form is that shown in the Ace of Swords in the Tarot. At all events, let the blade be straight, and the hilt a simple cross.

. . .*The Disk.* This ought to be of pure gold, with your own Pantacle, designed by yourself after prolonged study, graved thereupon. While getting ready for this any plain circle of gold will serve your turn. Quite flat, of course. If you want a good simple design to go on *interim*, try the Rosy Cross or the Unicursal Hexagram.

So much for the Weapons! Now, as your personal accoutrements, Robe, Lamen, Sandals and the like, *The Book of the Law* has most thoughtfully simplified matters for us. 'I charge you earnestly to come before me in a simple robe, and covered with a rich head-dress.' (AL, I:61) The Robe may well be in the form of a Tau Cross . . . The best head-dress is the Nemyss . . . you can easily make one yourself out of silk; broad black and white stripes is a pleasing design. Avoid 'artistic' complexities.

I feel moved to add a line of caution and encouragement . . .

Just as soon as you start seriously to prepare a place for magical Work, the world goes more cockeyed than it is already. Don't be surprised if you find that six weeks intense shopping all over London fails to provide you with some simple requisite that normally you could buy in ten minutes. Perhaps your fires simply refuse to burn, even when liberally dosed with petrol and phosphorus, with a handful of Chlorate of Potash thrown in



just to show there is no ill feeling! When you have almost decided that you had better make up your mind to do without something that seems really quite unobtainable – say, a sixty caret diamond which *would* look so well on the head-dress – a perfect stranger comes along and makes you a present of one. Or, a long series of quite unreasonable obstacles or silly accidents interfere with your plans: or, the worst difficulty in your way is incomprehensibly removed by some extraordinary ‘freak of chance.’

In a word, you seem to have strolled into a world where, well, it might be going too far to say that the Law of Cause and Effect is suspended; but at least the Law of Probability seems to be playing practical jokes on you.

This means that your manoeuvres have somehow attracted the notice of the Astral Plane: your new neighbours (May I call them?) are taking an interest in the latest Tenderfoot, some to welcome, they do all they can to help you to settle down, others indignant or apprehensive at this disturbance of routine. This is where your Banishings and Invocations come to the rescue. Of course, I am not here referring to the approach to Sanctuaries which of necessity are closely guarded, but merely to the recognition of a new-comer to that part of the world in general.

Of course all these miracles are very naughty of you; they mean that your magical power has sprung a few small leaks; at least, the water is oozing between some planks not sealed as Hermetically as they should be. But oh – and this is naughtier still – it is blessed, blessed comfort that they happen, that chance, coincidence, and all the rest will simply *not* explain it all away, that your new vision of life is not a dream, but part and parcel of Experience for evermore, as real as any other manifestation of Reality through sense such as is common to all men.

Crowley did not deviate from the Golden Dawn methods (in which he was instructed by Alan Bennett) until he had

thoroughly mastered them. These methods are both safe and sound, when followed to the letter, and are ideal for personal development. The manufacture of these instruments and Temple is an exceptionally strong way to approach the western esoteric Path. The reason is that the Golden Dawn, as opposed to most other systems, offers a totally structured 'course of studies.' Yet this is a method from which one may branch out freely once its principles have been understood.

While it is generally agreed that the most efficacious tools for ritual are those created by the student himself, not everyone is an artist or craftsman. Few today could follow the strict early directions stating that one must forge his own sword from solid steel! The important principle is that we do as much as we can, because the instruments become *charged* as they are made. The more effort expended, the more energy is attached to each piece.

Many of these materials, such as the Sword, Dagger and Cup, can be purchased ready to paint. One assumes true ownership of an instrument by painting it with the appropriate God Names and Sigils, and by its consecration. Those who lack time or skill are advised to commission their instruments from professional craftsmen, and then paint each piece as specified herein. We are required only to do our best, and are assured that the Gods will meet us half way.

One important point to consider is the extent to which these instruments are a means to an end. It is all too easy to become absorbed in the beauty and minutiae of the tools, to the extent that they acquire false importance. A plow is of no intrinsic significance except as it facilitates the tilling of the soil from which new life will emerge. The Magical Instruments are important in that they, too, facilitate a process leading to new life. But they are not essential; they are helpful. As Crowley said: "All sense and faculties must share in the work, such at least is the dictum of Western Ceremonial Magic. And so we find the magician placing stone upon stone in the construction of his Temple. That is to say, placing pantacle upon pantacle, and safeguarding his one idea by means of swords, daggers, wands, rings, perfumes, suffumigations, robes, talismans, crowns, magic squares and astrological charts, and a thousand other symbols of things, ideas and states, all reflecting the one idea; so that he may build

up a mighty mound, and from it eventually leap over the great wall which stands before him as a partition between two worlds."

Unfortunately, some may believe that the construction of a Temple, and the traditional instruments of the magician will confer instant enlightenment and power of some sort. It may be supposed that this is a relatively painless way to effect entry into the Inner Worlds, which is not at all true. The *Magical Path* is as slow and arduous as the *Meditational Path*.

Western ritual is admittedly theatrical. There is, in fact, something very flamboyant about the creation and use of the magical instruments. But this is as it should be. Ritual and its accoutrements offer a special focus of attention, drawing us inward. An easterner may sit silently on the ground and invoke the forces of nature with enviable simplicity. We, on the other hand, must contend with an energetic environment working against inner tranquility. Ritual helps us to transcend the weighty dynamism of our culture. As one assumes the gold-edged white robe, feels the slight weight of the Rose-Cross Lamen around his neck, and begins to work with the tools of traditional esoteric science, there is a feeling that one stands between two worlds. It is as profound a feeling as that of a priest preparing for the Christian Eucharist. And, of course, that is the point: by preparing our instruments and Temple, we may, in a lesser way, ordain ourselves into the priesthood of the Great Work.

Ideally, one would belong to an Order, where the preparation of these materials is part of the initiation of Tiphareth. Yet far too many of today's so-called "Orders" (including some established by very great occultists of the past) are of suspect integrity. Suffice it to say that if one is intended to work with a truly enlightened group, it will find him. As the aphorism states: *When the student is ready, the master appears.*

Individual work is more difficult, but it is possible today thanks to publications of teachers in the Golden Dawn tradition such as Israel Regardie, Aleister Crowley, Dion Fortune, Paul Foster Case, Gareth Knight and W.E. Butler. Regardie's work, *The Golden Dawn*, is the primary source book for the system in which these instruments are used, and must be considered a life-



time study. Moreover, this present book may make little sense to those completely unfamiliar with Regardie's *Golden Dawn*.

## *Minimal Requirements*

There are many people who can afford neither the time nor the money for instrument construction, but who wish to pursue magic in some way. For those a 'stripped-down' version is possible, requiring little effort and virtually no craft skills. Such instruments are unlikely to have the vitality of a more sophisticated set, but they will allow ritual work to be performed.

The basic instruments are: *The Wand of the Magician*, *The Fire Wand*, *The Water Cup*, *The Air Dagger* and *The Earth Pentacle*.

### THE WAND OF THE MAGICIAN

This may be a piece of 3/4 inch dowel rod, approximately twelve inches long. It should be painted gold.

### THE FIRE WAND

This may be a piece of 1/2 or 3/4 inch dowel rod, ten inches long, painted bright red.

### THE WATER CUP

Any metal cup painted blue, or any blue glass cup would be appropriate.

### THE AIR DAGGER

Any knife or letter opener can be used, although a cross piece at the hilt is desirable. The knife is painted bright yellow.

### THE EARTH PENTACLE

This is a simple round wooden disc, approximately four inches in diameter, painted black. Hobby shops, hardware and lumber dealers often sell wooden circles of plywood.

The assembly and painting of these simple instruments requires about four hours, and little cost. The suggestion is made here to counter a common belief that magical tools are all but impossible to produce. In fact, one makes a commitment to



the system according to his own needs. One who is highly spiritually developed may not need to expend the effort to produce an elaborate set of instruments, although most people will find that pouring great energy into this work is invaluable in forming a link with the inner currents established by the Golden Dawn. There is, in this, something of being willing to sweep out the Temple before one is permitted to sacrifice at the altar.

A natural artist or craftsman may spend years producing a beautiful and highly sophisticated set of instruments which is personally appropriate. And again, these tools should be the best we can do. They become extensions of ourselves which are consecrated and, although they may be seen, must never be touched by another.

# *Part I / The Instruments*



## 2 / The Lotus Wand

The wand is the primary tool of the magician in the Golden Dawn system, its consecration being a superb introduction to the rites of consecration in general. Some, however, express the opinion that the Lotus Wand is unnecessarily difficult to use. It is, admittedly, quite long, can never be inverted, and must be held by difficult sections according to the operation at hand. Despite such restrictions, many find it to be an exceptional instrument.

Since a wand symbolizes the *Will* it is a very personal tool, and ingenuity may be applied in its construction. Those who do find the Lotus Wand cumbersome may wish to prepare a second wand, of their own design, for more regular use.

A great deal has been written on the subject of wands, suggesting that to make one is a feat equaling the building of the pyramids. Contrary to *ex cathedra* pronouncements by certain occult writers, it is not necessary to cut a birch branch with a golden sickle, at two in the morning on the Sahara desert, when Pluto is conjunct Mercury. What is most important in the construction of any instrument is its consecration. And since the ability to consecrate is a measure of progress along the Path, a student spares no detail which may add to the energies contained in his instruments. It is for this reason that a simple set may be sufficient for the more spiritually advanced, who naturally confer power in consecration. Others must begin the process of consecration with the "sweat of their brows," building

energy into each piece as they work on it, and then intensifying and sealing that energy with a ritual of consecration.

One end of the Lotus Wand is white, symbolizing Pure Spirit, and the other end is black, symbolizing the Earth. They are the *Light* and *Darkness* between which are bands of color referring to the *Signs of the Zodiac*. The Planets are also implied here, since 'Planets live in Houses,' and one holds the band of the Zodiacal sign where a particular planet is resting, for an operation of that Planet.

Above all is a White Lotus flower. The Golden Dawn text states: "The 10 upper and inner Petals refer to the Purity of the Ten Sephiroth. The middle 8 refer to the counter-charged natural and spiritual forces of Air and Fire. The lowest and outer 8 refer to the powers of Earth and Water. The centre and amber portion refers to the Spiritual Sun, while the outer calyx of four orange sepals shows the action of the Sun upon the life of things by differentiation." It will be seen that there are twenty-six petals, which is the number of the Yod Heh Vau Heh.  $Yod (10) + Heh (5) + Vau (6) + Heh (5) = 26$ .

## Construction

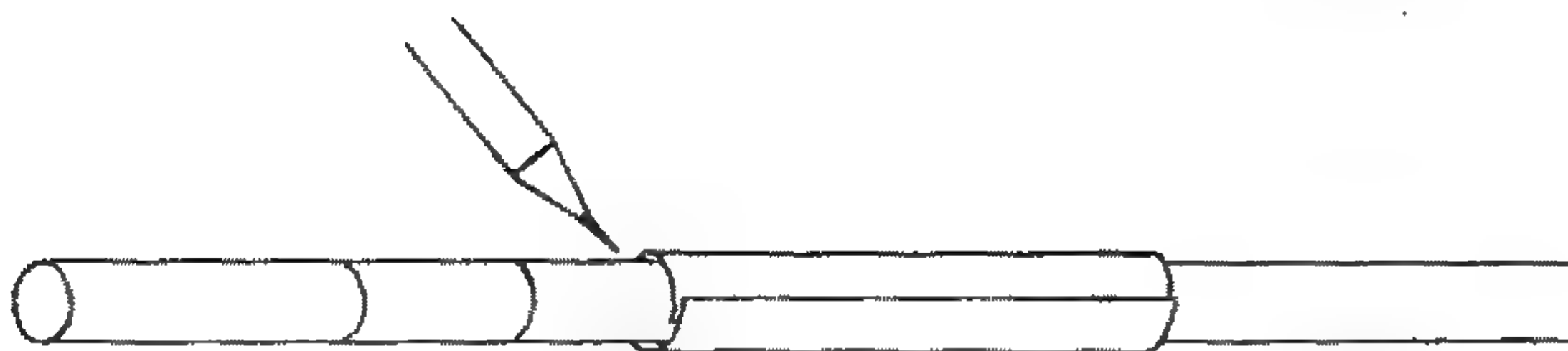
The shaft of the wand should be 3/4 inch dowel rod, varying in possible length from 24 to 40 inches. In practice, the shorter length is best, since it is more easily manipulated and stored (Note that the instruments are stored inside the Altar).

1) Sand the rod lightly, rounding the end to be painted black.

2) Coat the rod with gesso, and again sand lightly. Gesso, a white acrylic medium, seals the wood and forms a base for finished painting. It is available in any art supply store.

This medium, which is water-based and fast drying, should be applied in two thin coats. Brushes must be washed immediately in soap and water, as a very hard and waterproof coat forms when gesso is completely dry.

3) With a ruler and soft pencil, divide the rod into sections. The white end should be the longest, then the black, and finally twelve sections of equal size. Place small marks along the length of the rod. Then, with a rolled piece of heavy paper or cardboard acting as a circular straight-edge, inscribe lines around the rod:

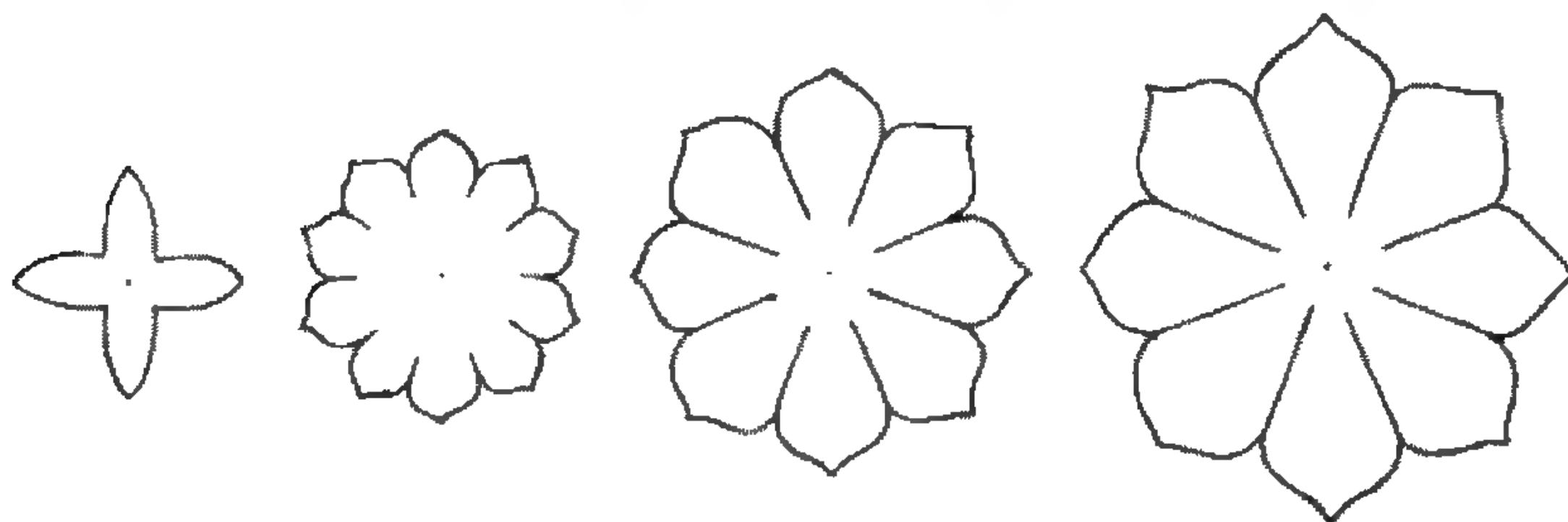


4) Using *artist's acrylic paint* (those sold in tubes, not in jars), carefully fill in the colored bands as indicated on page 16. Work about half-way down the wand, and allow the colors to dry. Then invert the wand and complete the bands at the opposite end. A tall jar will provide support during this process.

Artist's acrylics are ideal for painting on wood. They are the brightest colors available, and produce the extraordinary "flashing" effect described in occult documents. A basic set of colors can be purchased, and mixed as needed. Like gesso, these are water-soluble, but harden quickly, and should not be allowed to dry on brushes. Acrylic paints should be washed from brushes with soap and *warm* water (hot water is not good for brushes).

5) Allow the paint to cure for several days, then coat the wand with a clear acrylic varnish such as Grumbacher *Picture Varnish*, or Weber *Univar*. Ordinary wood varnish, shellac or lacquer should not be used.

6) Trace the four pieces of the Lotus flower onto sheet metal. A simple heavy-weight aluminum cookie sheet is adequate, and can be cut with metal shears. Those who find work with metal hopelessly difficult may cut the flower from heavy cardboard. On the other hand, those who wish to produce a very elaborate wand may cut the Lotus from wood or solid metal, cast it in metal, or even make it of clay (fired and glazed in the correct colors).





7) Cut around the outsides of the four designs, then smooth the edges with a file and emery cloth.

8) Drill a hole in the center of each of the pieces.

9) Using pliers, with cloth padding between them and the metal to avoid indenting the petals, bend the pieces so that they turn slightly inward as if in the process of opening.

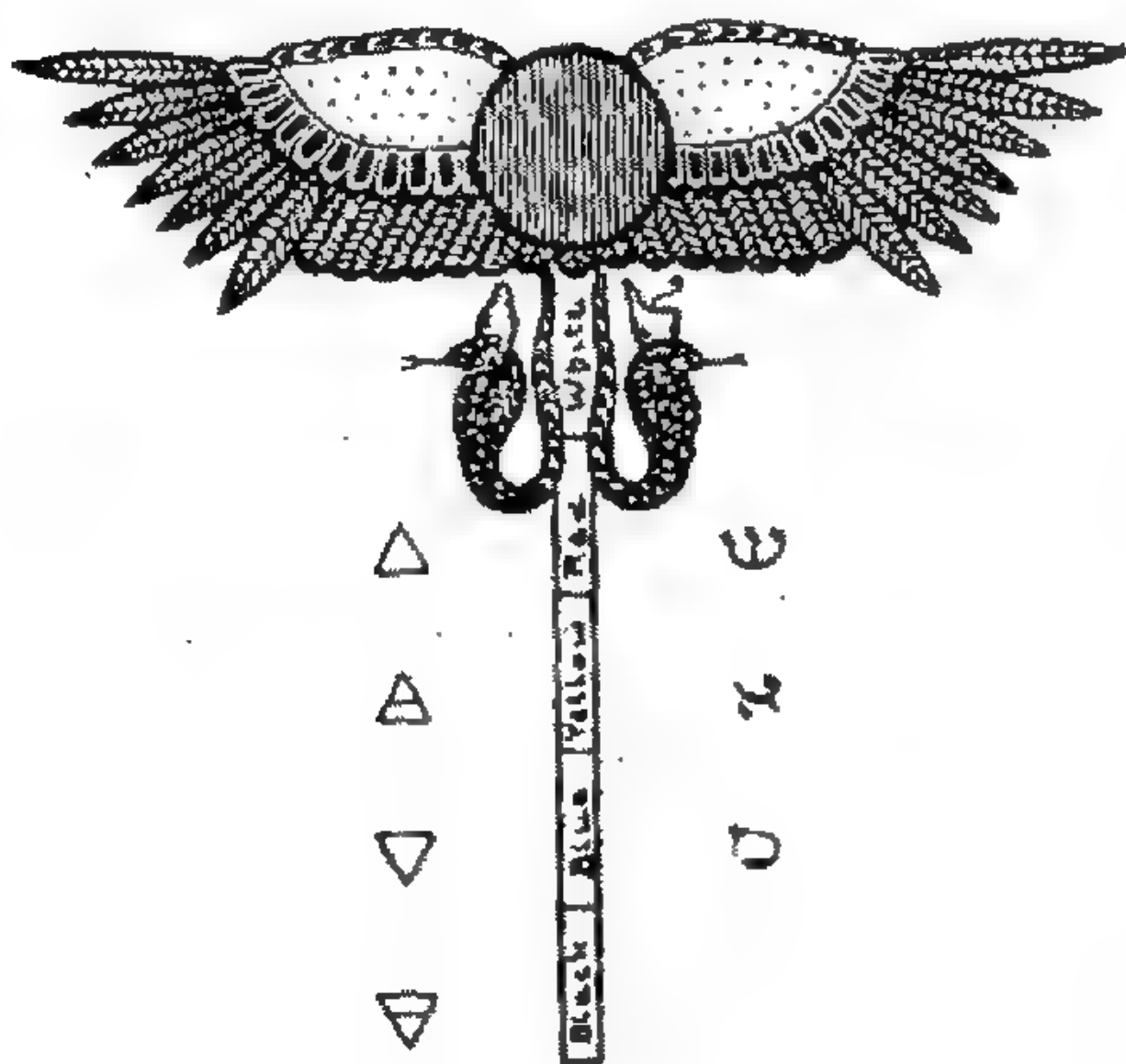
10) With a spray metal undercoat paint, cover both sides of the pieces (light coats should be built up). The undercoat must then cure for about twenty-four hours, although it may be dry to the touch almost immediately.

11) Using enamel paints (acrylics will not hold to metal), color the pieces according to directions. If the Lotus is of cardboard, coat the petals with gesso, then finish with acrylics and varnish in a few days.

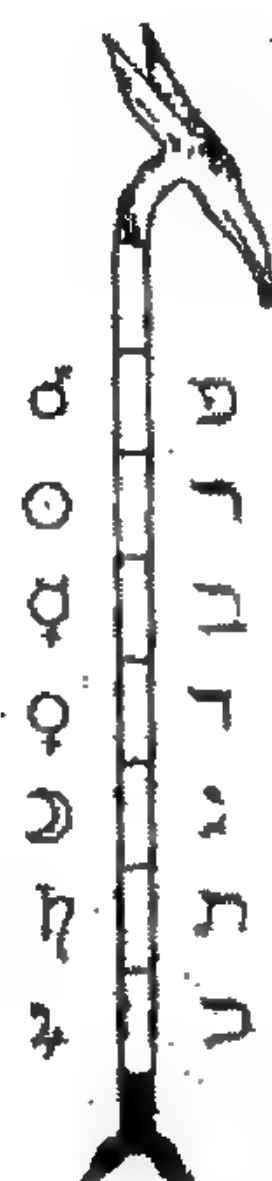
12) When the pieces are completely dry, attach them to the wand by inserting a small brass screw through the holes into the white end of the painted dowel rod.



Lotus Wand

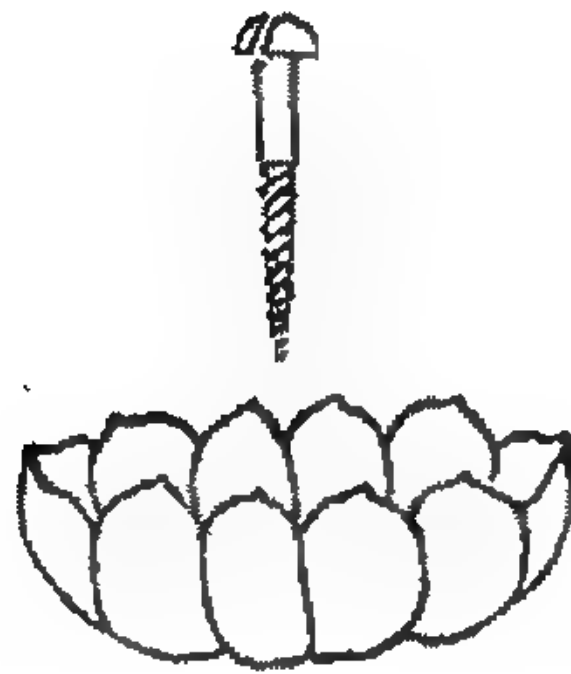


Chief Adept's Wand

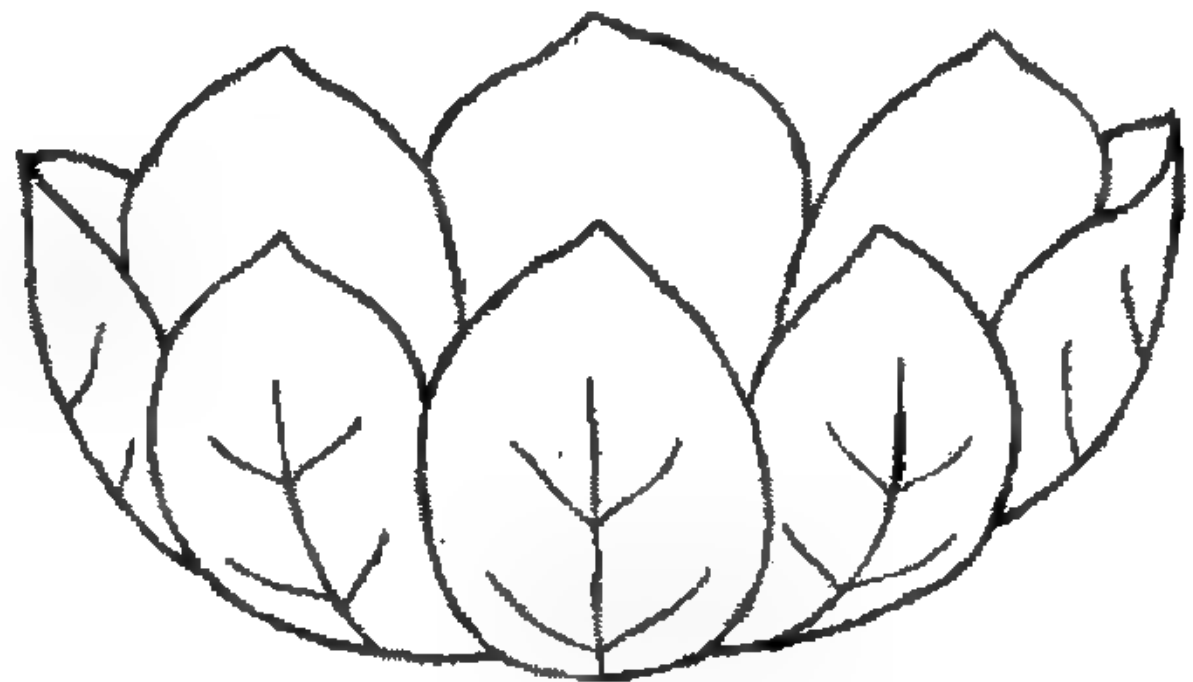
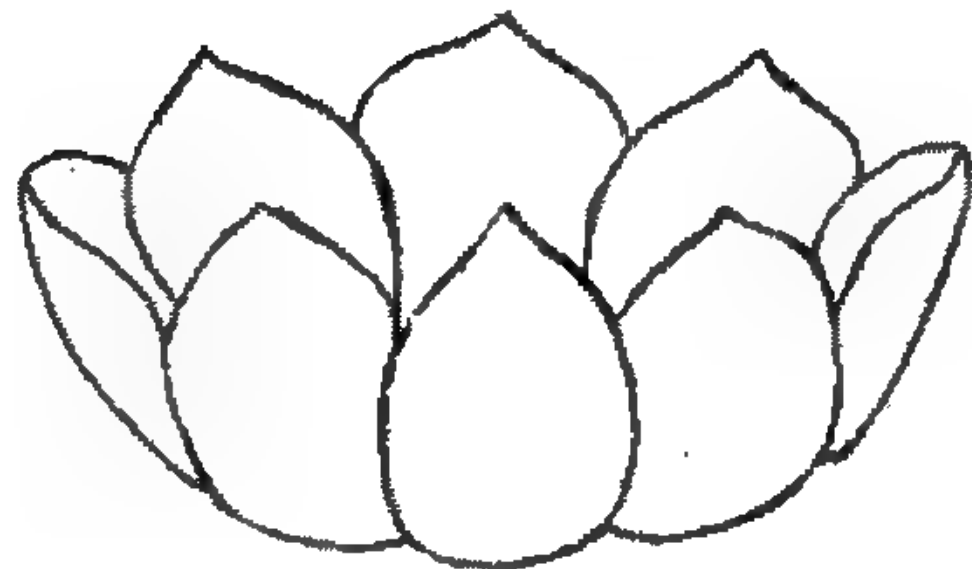


Phoenix Wand

Both inside and  
outside of the petals  
are white on  
this piece



On these two pieces  
the inside is  
white and the outside is  
olive green, with a  
pattern of five veins  
painted in darker  
green (mix green  
and black)  
on the larger piece



The calyx is orange  
on both sides





THE LOTUS WAND

*Symbolism from the Rose Cross:*

*Path of the  
Tree of Life*

*Spirit*

*White* →

15    א

Aries

*Red* →

16    י

Taurus

*Red-orange* →

17    יז

Gemini

*Orange* →

18    ח

Cancer

*Amber* →

19    ט

Leo

*Yellow* →

20    יח

Virgo

*Yellow-green* →

22    טז

Libra

*Emerald* →

24    יג

Scorpio

*Green-blue* →

25    יב

Sagittarius

*Blue* →

26    יא

Capricorn

*Indigo* →

28    יז

Aquarius

*Violet* →

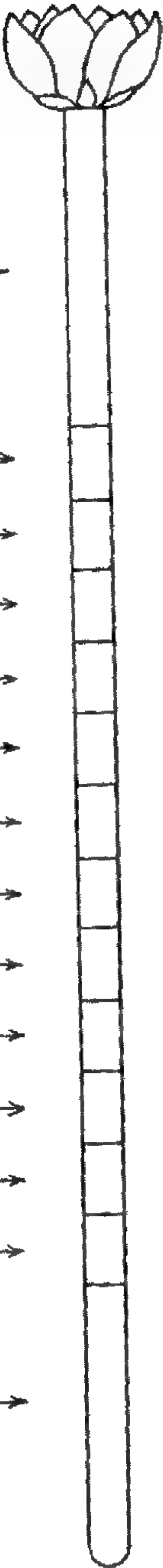
29    יח

Pisces

*Crimson* →

Earth

*Black* →



## Alternative or Supplemental Wands

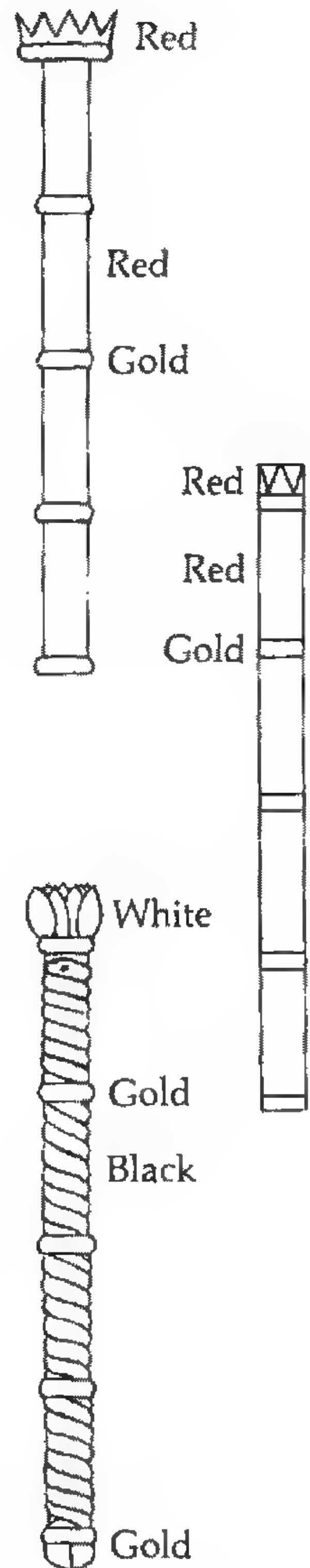
Once the underlying principles of the wand are grasped, it may be adapted to suit the temperament of the user. A number of variations on Golden Dawn designs may be considered.

A) Some may prefer to use the wand of the Hierophant. This is a simple shaft with four bands and a crown above. The shaft divisions refer to the five Sephiroth (including Daath) on the Middle Pillar of the Tree of Life.

A crown can be cut from soft wood or metal. Soft metals, such as brass, can be carved using a Dremel Moto Tool and metal files, which is not as difficult as some might believe.

B) An extremely simple variation of the Hierophant's wand can be painted. In this example a dowel is painted red, with five gold bands and a red crown above.

C) It is also possible to combine the qualities of the Hierophant's wand and the Lotus Wand into a very effective instrument. Here a shaft is carved of 3/4 inch dowel, representing the Serpent Kundalini on the Middle Pillar. The small Lotus is carved from a separate block of wood and painted in the standard green and white. Or it can be carved from brass and left unpainted. The base, symbolizing Malkuth, is quadripartite.





### 3 / The Rose Cross Lamén

This is the second of the instruments to be constructed, and from it are derived the *Sigils* painted on the other pieces. It is a symbol which synthesizes all of the concepts of Rosicrucian philosophy.

At the center is the Five-Petaled Rose on a golden cross. This represents the Qabalistic principle of the four Elements which are controlled, balanced and activated by a fifth: Fire (Yod), Water (Heh), Air (Vau) and Earth (Heh final) describe the constituent parts of the Personality, ruled by the Higher Self of Tiphareth to which the gold cross is ascribed.

The Rose also stands for the entire manifest Universe. At the highest level of the Tree of Life, Kether is the four Primordial Elements (unexpressed), set toward manifestation by the power of the Unmanifest above the Tree. This principle is explained fully in Regardie's *Golden Dawn* and in *The Qabalistic Tarot*\* by Robert Wang.

The twenty-two Hebrew letters around the cross are arranged according to the text of the Sepher Yetzirah: the three inner letters are the maternals, from which all the other letters (i.e., forces of the Universe) are derived. The middle circle contains the simple letters, related to the seven ancient planets. The outermost circle contains the double letters which are the signs of the Zodiac. In all, the letters are the twenty-two mystical Paths on the Tree of Life.

\**Qabalistic Tarot*. Samuel Weiser, Inc. New York, 1980.

To form a sigil using the Rose, a continuous line is drawn from one Hebrew letter to the next. This is a method apparently developed by the Order of the Golden Dawn. Until the late nineteenth century, such Sigils were derived from traditional magic squares.

For example, let us take the name RAPHAEL, the Archangel related to Air appearing on the Dagger. In Hebrew the name is spelled Resh, Pe, Aleph, Lamed (reading from right to left):

A sigil usually begins with a small circle, and ends with a short line, although this is not essential. All that is really necessary is to trace a line from one letter to the next. If there are two words in a God Name, such as ELOHIM GIBOR (for the Sword) or YHVH TZABAOTH (for the Fire Wand) two separate sigils are required.

Each of the arms of the Cross represents one of the Elements. Here it will be seen that the Hexagram (meaning six planets around the Sun) separates the Earth from direct contact with the Holy Center. This refers both to the Earth as the product of the *Fall*, and as the receptacle for all of the other Elements.



### THE SIGIL FOR רפאל DERIVED FROM THE ROSE

\*It should be noted that the "Ancient Cypher Manuscripts" of the Order used the traditional Elemental triangles ( $\Delta \nabla \Delta \nabla$ ) around the Pentagrams of the Rose Cross. This older form of Elemental symbol is also shown on the Rose Cross Lamén published by Crowley in the *Equinox*. In the later period of the Order, the *Kerubic Signs*, shown in the color illustration, were adopted for use on the Lamén. It was believed that they were more effective than the triangles.

## THE HEBREW ALPHABET

א		ALEPH	A
ב		BETH	B, V
ג		GIMEL	G, GH
ד		DALETH	D, DH
ה		HE	H
ו		VAU	O, U, V
ז		ZAYIN	O, U, V
ח		HETH	Ch
ט		TETH	T
י		YOD	I, Y
כ	(ך)	KAPH	K, Kh
ל		LAMED	L
מ	(ם)	MEM	M
נ	(ן)	NUN	N
ס		SAMEKH	S
ע		AYIN	Aa, Ngh
פ	(ף)	PE	P, Ph
צ	(ץ)	TZADDI	Tz
ק		QOPH	Q
ר		RESH	R
ש		SHIN	S, Sh
ת		TAV	T, Th

The letters Kaph, Mem, Nun, Pe and Tzaddi take a special form (in parentheses) used when they appear at the end of a word. No such distinction is made on the Rose Cross, and when a final letter appears, it is traced from the general point of the letter.



## *Cutting Out the Cross*

While the Rose Cross Lamen can be cut from heavy cardboard, 1/8 inch plywood is preferable. This should be a hardwood, such as birch, which has a perfectly flat and smooth surface. Soft building plywood may form ridges when sanded, and should not be used.

1) Sand the board lightly, front and back, and coat with gesso. In all cases where wood is used, both sides should be sealed to avoid the possibility of warping.

2) When the gesso is dry, sand, apply a second coat and sand again. Sanding should always be done with a sanding block, or with sandpaper wrapped around a flat piece of wood.

3) Draw an outline of the Cross on the board.

4) With a coping saw, or an electric jig saw if one is available, cut around the outline of the Cross. A jig saw will keep the edges at a sharp right angle. But, if this is being cut by hand, care must be taken to maintain the straight cut of the blade. Accidental over-cutting is no disaster; errors are easily corrected.

5) After cutting there may be some small gaps in the sides of the plywood. These can be filled with one or more coats of gesso. Serious gaps or over-cuts must be filled with plastic wood.

6) Coat the sides with gesso. Because of the absorbancy of the end grain, several coats may be required to completely seal the edges.

7) Sand the edges of the Cross.

## *Painting the Cross*

As with the other wooden instruments, acrylic paints are recommended. A very effective metallic gold paint is also available in artist's acrylic.

There is one media problem, however, which should be considered: All paints tend to cure after a time, and new paint applied over very old paint may not adhere properly. Thus it is best that no more than a few days elapse between painting the undercolors and the symbols. If paint has been allowed to cure for some time, it should be sanded and repainted prior to adding the details.

The most exacting work can be done by those who are comfortable using a *ruling pen*. The Pentagrams and Hexagram can be drawn with great precision, using this tool and water thinned paint (thick paint will not flow from the pen), although two coats may be required for each line. The same technique can be applied to any straight line on the Cross, such as the divisions of the four Elemental colors on the lower arm.

Admittedly, the use of a ruling pen is difficult, but the more accurately the lines are drawn, the more impressive the overall effect. A pair of dividers is also useful for establishing spacing on the areas around the circle, and for precise divisions of the Pentagrams and Hexagram.

8) With compass and ruler, draw the major sections of the Cross. Eliminate the Pentagrams, Hebrew letters and other details which are to be overpainted on a color background.

9) Apply all of the background colors, including the petals of the Rose.

10) When the background colors are dry, add the details in colors which are as flashing as possible. Technically, this means using two colors which are exactly opposite each other. The opposite of red is green. The opposite of orange is blue, etc. Some experimentation with color mixing will be necessary before the best result is achieved. This is particularly the case with the Hebrew letters and their background colors.

11) Paint the back of the Cross with a white ground and black symbols. Here, for the first time, we encounter the *Motto* which is painted on each of the instruments. The principle is the same as that of an individual who enters a monastic order and takes a symbolic new name. The magical motto expresses an intention, and each student chooses one according to his or her temperament.

Following are some mottos of original members of the Golden Dawn, which should be considered as samples only. While most of these are in Latin, a motto can be in any language.

*S'Rioghail Ma Dhream* (Royal is My Tribe) S.L.  
MacGregor Mathers  
*Vestigia Nulla Restrorsum* (No Traces Behind) Mrs.  
Mathers



*Magna Est Veritas Et Praevalebit* (Great is the Truth and  
It shall Prevail) William Woodman

*Sapere Aude* (Dare to be Wise) Wynn Westcott

*Demon Est Deus Inversus* (The Devil is God Turned  
About) W.B. Yeats

*Iehi Aour* (Let There Be Light) Alan Bennett

*Perdurabo* (I shall Endure) Aleister Crowley

*Sacramentum Regis* (The Sacrament to the King) A.E.  
Waite

12) Once the front and back are completed, the sides of the Cross should be painted. The same acrylic gold used for the central cross is appropriate, since the Lamen relates to Tiphareth. As was undoubtedly discovered in painting the central cross, several coats of acrylic gold produce a very translucent and glowing effect.

## *The Colors*

Extreme center of Rose = white

Rose = red

Leaves = green

Central cross = gold

Uppermost arm = yellow background, purple symbols

Left arm = red background, green symbols

Right arm = blue background, orange symbols

Bottom arm = top part: white, black symbols

bottom part: citrine (somewhat dark to accommodate the white pentagram) olive, russet, black. Symbols are white.

The colors on the Rose are those of the King Scale, and are those of the Paths attributed to the Hebrew letters in Atziluth, the World of Pure Spirit. These are found in the section of *The Golden Dawn* entitled "Concerning the Tree of Life," and in Crowley's 777.

- |   |    |                    |
|---|----|--------------------|
| κ | 11 | Bright pale yellow |
| ι | 12 | Yellow             |
| λ | 13 | Blue               |
| γ | 14 | Emerald Green      |
| η | 15 | Scarlet            |

ו	16	Red-orange
ז	17	Orange
ח	18	Amber
ט	19	Greenish-yellow
י	20	Yellowish-green
כ	21	Violet
ל	22	Emerald Green
מ	23	Deep Blue
נ	24	Green-Blue
ס	25	Blue
ע	26	Indigo
פ	27	Scarlet
צ	28	Violet
ק	29	Crimson (ultra violet)
ר	30	Orange
ש	31	Glowing orange-scarlet
ת	32	Indigo

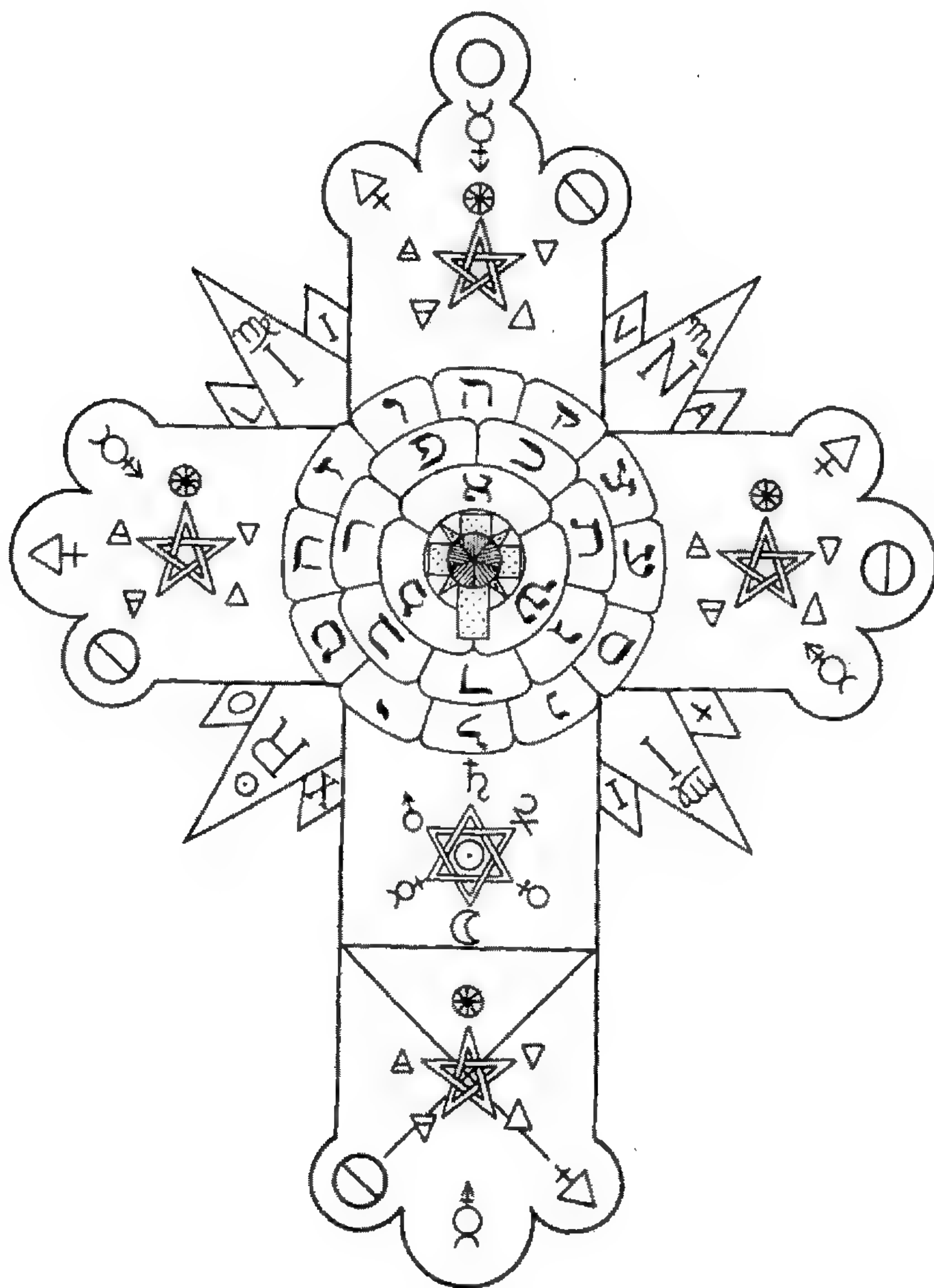
The opposites of all of these colors can be worked out using a color wheel.

## *Finish*

After the paints are thoroughly cured, which should take several days, the Cross must be coated with a non-yellowing acrylic varnish such as that used on the Lotus Wand. A second coat of varnish is generally advisable.

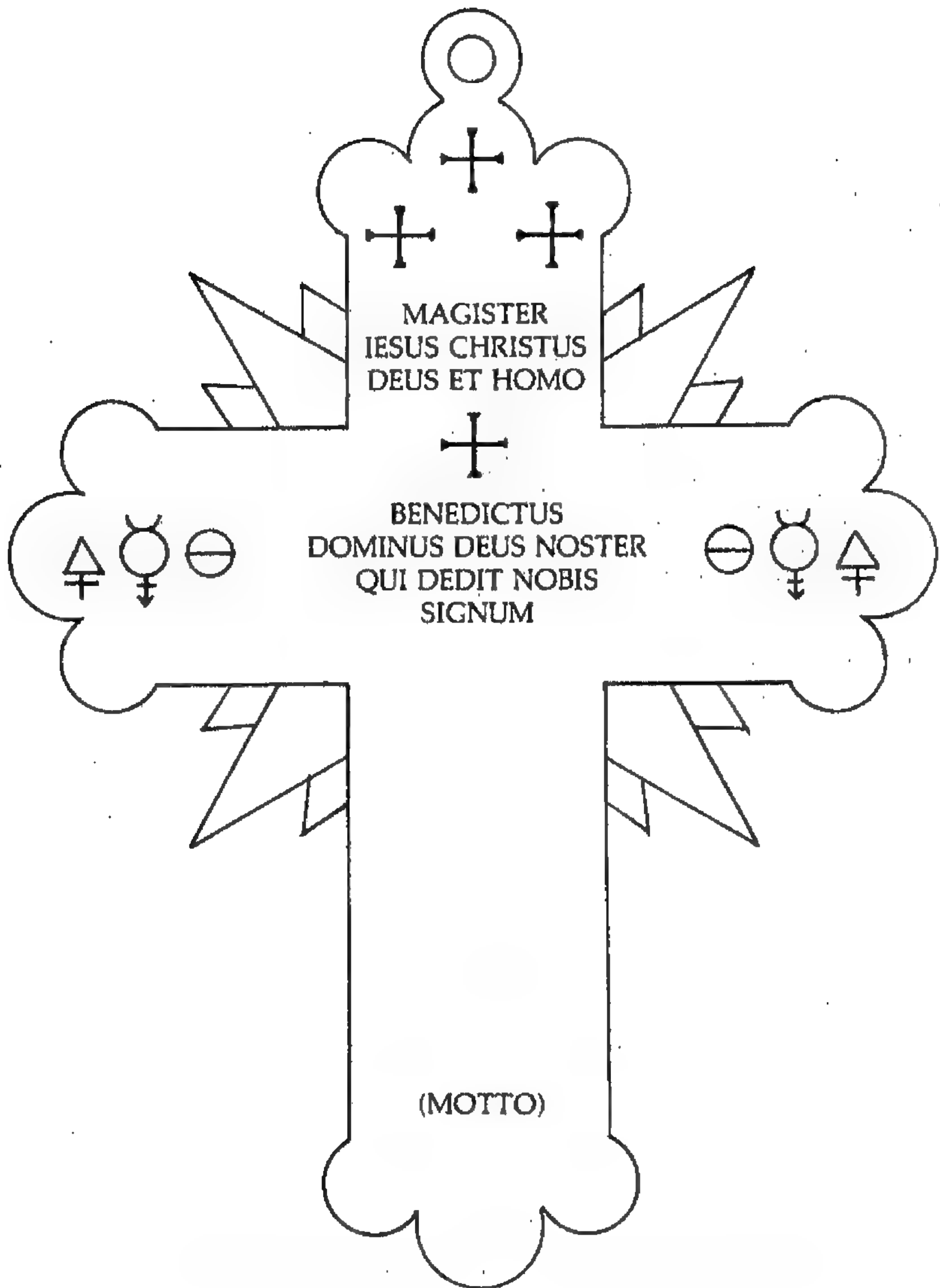
Finally, the Cross is suspended from a yellow colarette. Silk is preferred, but a synthetic fabric is adequate. The colarette should be made of two pieces of fabric, interfaced with muslin to give it body.

The Cross is then attached, using either a heavyweight thread or a metal ring of some kind. Rug-button thread, embroidery floss or waxed jeweler's thread are all excellent for this purpose. A metal ring can be made from heavy wire, bent with pliers or a special bending jig. Metal rings are also available from jeweler's supply companies.



### THE ROSE CROSS LAMEN

From Aleister Crowley, *The Equinox*, Vol. 1, No. 3. This is the older version of the Rose Cross, as described in the *Golden Dawn Cypher Manuscripts*, using triangular symbols of the Elements, rather than the four Kerubic Emblems.



THE ROSE CROSS LAMEN: REVERSE



## 4 / The Sword

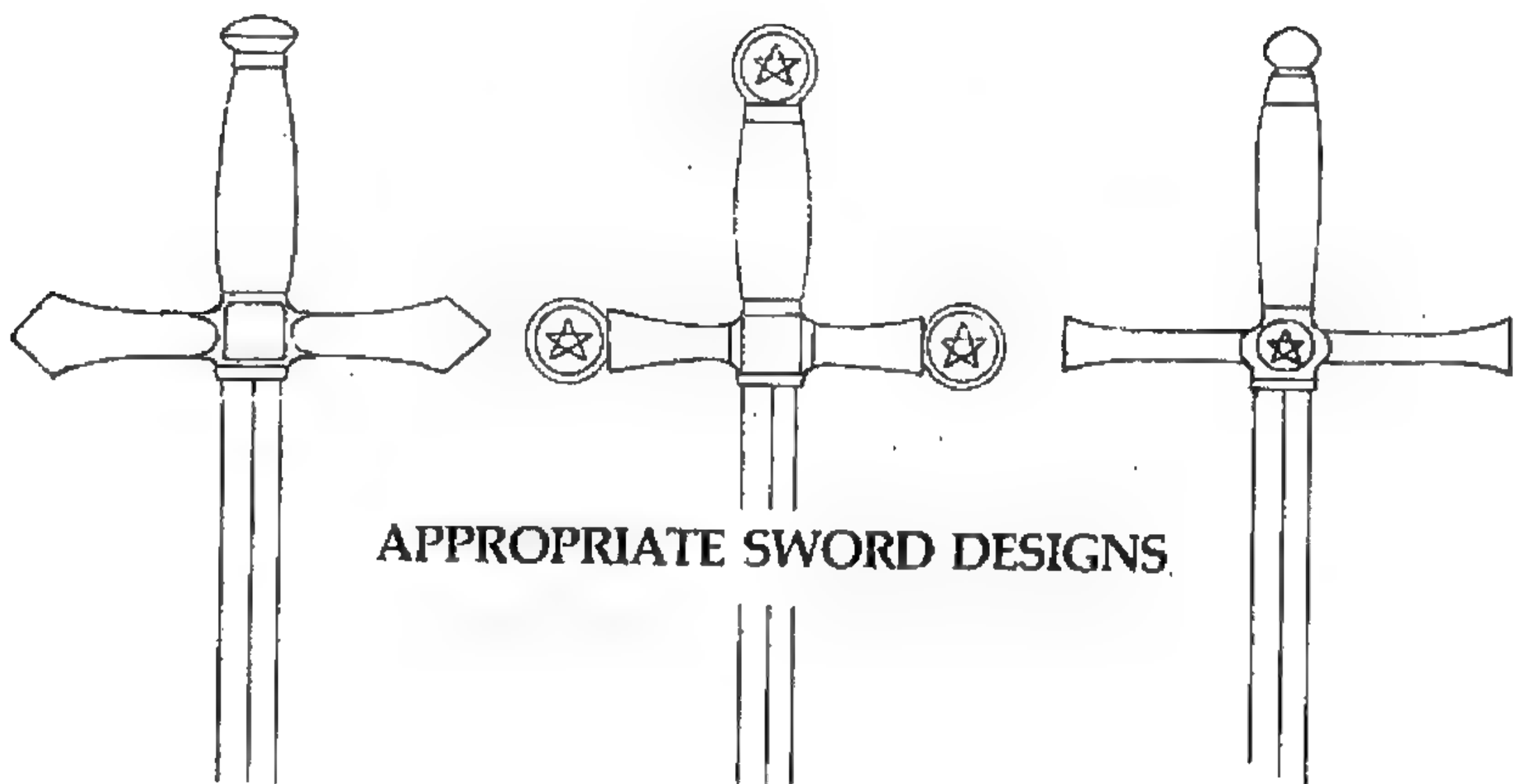
The Magical Sword is used in all instances where great force in invocation, evocation or banishing is required. It is an instrument relating to the fifth Sephira, *Geburah* (Strength) on the Tree of Life. Thus, the *Pentagram*, or five pointed star is one of its key symbols.

The assumption will be made that very few readers of this book are blacksmiths, and that those who are will require no instruction on forging their own sword from solid metals. Most of us find it necessary to purchase a sword, and paint it according to the traditional directions.

The Golden Dawn text states that: "Any convenient sword will do." However, this suggestion was made at a time when swords actually were conveniently available, being often required for Victorian ceremonial use. Swords available today in antique shops, most of which are from the nineteenth century, tend to be overly ornate and of little use because they offer no room for painted inscriptions. Thus, the student is advised to purchase a modern sword designed specifically for ritual use from an occult or Masonic supply house. Such swords are usually far less expensive than antiques.

Choose a sword which is not too heavy, preferably one with a wooden handle and a simple cross bar of brass. The latter should be fairly wide, to allow for the painting of symbols, God Names and sigils.





## *Painting the Sword*

1) If the wooden handle has been coated with enamel or varnish, which is likely, remove the finish completely using a semi-paste paint remover. When down to bare wood, sand, coat with gesso and sand again lightly.

2) Rub the metal parts of the handle with medium emery cloth. This will give the metal 'tooth,' helping to hold the undercoat paint. The most serious risk in painting metals is that the paint will adhere improperly and flake off. Careful preparation of the surface, and undercoating, minimizes this possibility.

3) With masking tape and strips of newspaper, cover the blade and the gesso-coated wooden handle.

4) Spray the metal areas of the handle with undercoat. When this is dry to the touch, remove the masking and clean any areas where the paint has run or oversprayed. Then allow the Sword to dry overnight.

5) Color the handle bright red using acrylic paint. With enamel, also bright red, color the metal parts. Try to choose colors which are as similar as possible, so that the difference in media will not be obvious.

6) Paint all sigils, God Names and the Motto. These are to be a very bright green, so that they will flash on the red background. All Names are in Hebrew, and should be painted with care and respect. Each letter is, in itself, a magical symbol of great power.

After the Names and sigils have been completed, retouch as necessary, using the background reds. If a few hours elapse between painting the background and symbols, mistakes can easily be corrected. A false start can be lifted off with a cotton swab dipped in water if using acrylics, or turpentine for enamels. If this is done very carefully, the background paint will not be picked up.

There are nine sets of symbols to be applied to the Sword: seven God Names and their associated Sigils, the Motto, and Pentagrams to fit the design of the Sword:

- I) THE GOD NAME OF GEBURAH AND ITS SIGILS:  
ELOHIM GIBOR
- II) THE ARCHANGEL OF GEBURAH AND ITS SIGIL:  
KAMAEEL
- III) THE CHOIR OF ANGELS OF GEBURAH AND ITS  
SIGIL: SERAPHIM
- IV) THE HEBREW NAME OF THE PLANET MARS AND  
ITS SIGIL: MADIM
- V) THE ANGEL OF THE PLANET MARS AND ITS  
SIGIL: ZAMAEEL
- VI) THE INTELLIGENCE OF THE PLANET MARS AND  
ITS SIGIL: GRAPHIEL
- VII) THE SPIRIT OF THE PLANET MARS: BARTZABEL
- VIII) THE MOTTO
- IX) PENTAGRAMS BALANCED AROUND THE SWORD



## COMPLETE INSCRIPTIONS ON THE MAGICAL SWORD

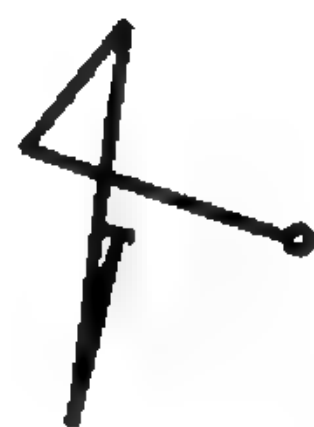
*(Paint the Hebrew name followed by its sigil)*



אלהים גבור  
I. ELOHIM GIBOR



כמאל  
II. KAMAEL



שרפים  
III. SERAPHIM



מדים  
IV. MADIM



זמאל  
V. ZAMAEL



גראפאל  
VI. GRAPHIEL



ברצבאל  
VII. BARTZABEL



VIII. THE MOTTO

IX. PENTAGRAMS

## 5 / The Fire Wand

This is the first of the Elemental Weapons, symbolic of the Forces of the *יהוה*. The Wand, Cup, Dagger and Pentacle are also the four symbols of the Tarot.

The Fire Wand presents a special problem in that it must have a magnetic wire running through its center, from one end to the other. Here again, one may wish to simply purchase the wand ready-made, although its construction is not so difficult as it might appear.

### *Construction*

Because the Fire Wand is approximately ten inches long, drilling from one end of a piece of dowel to the other would be a difficult task for the average craftsman. Consequently, it is expedient to saw a one inch dowel rod lengthwise, insert the wire, and glue the pieces back together.

Some writers (in discussing magician's wands) emphatically insist that to insert a wire in this way should never under any circumstances be done, because it destroys the integrity and purity of the rod. But that advice is anachronistic. The seventeenth, eighteenth and nineteenth centuries saw the publication of many books purporting to describe the tools of magical work. The supposed requirements were so stringent as to discourage those who lacked sufficient commitment to the real task of spiritual development. We may suppose that those who

refused to be discouraged, and who were intended to follow the ritual Path, found guidance in understanding what is and what is not actually important.

1) With a coping saw, cut a carefully-braced 1 inch by 10 inch dowel rod in half lengthwise. This is best done with a small vice, an inexpensive piece of equipment which is a *must* for constructing these instruments, at least for those who do not consider the sudden removal of a finger a significant part of their magical training.

2) Take a piece of steel wire 1/16 inch in diameter by 10-1/8" long, and repeatedly move a strong magnet across it in one direction, until it becomes sufficiently magnetic that it will pick up a pin. The end which *attracts* the pin will go at the conical end of the wand.

3) Cut a slight groove in both pieces of the rod, so that the wire will fit into it.

4) Insert the wire so that it extends 1/16 inch at each end.

5) Apply a very thick glue, such as Hideskin, to both pieces of the wand. This heavy glue will compensate for the wood lost in cutting the rod apart.

6) Push the two pieces together lightly, so that some glue is squeezed out, and the original cylindrical form of the rod is restored.

7) Allow the wand to dry overnight.

8) Fill gaps with plastic wood and/or gesso, allow to dry thoroughly and sand.

9) Measure the sections of the Wand, marking them with pencil. A rolled piece of cardboard will serve here, as it did on the Lotus Wand.

10) With a wood rasp, files, knives, etc., carve the conical end piece. Then cut away the three main sections, leaving four bands.

There are, obviously, a number of ways in which this wand could be made. It could be made in two main pieces: the conical end being carved separately and glued to a 3/4 inch shaft, with subsidiary bands of cardboard or other material glued around the outside. It could also be cut on a lathe.

11) Smooth the wand first with a heavy, then with a fine sandpaper.

12) Apply two coats of gesso, sanding lightly between each coat.

13) Color the red parts of the wand using artist's acrylic paint.

14) Color the yellow bands and the Yods on the endpiece (Do not paint the bits of steel which extend from either end). Acrylic yellow tends to be very transparent, and any streaks of red underneath will show through. If there are any smeared areas of red, coat these with white acrylic and then two coats of yellow.

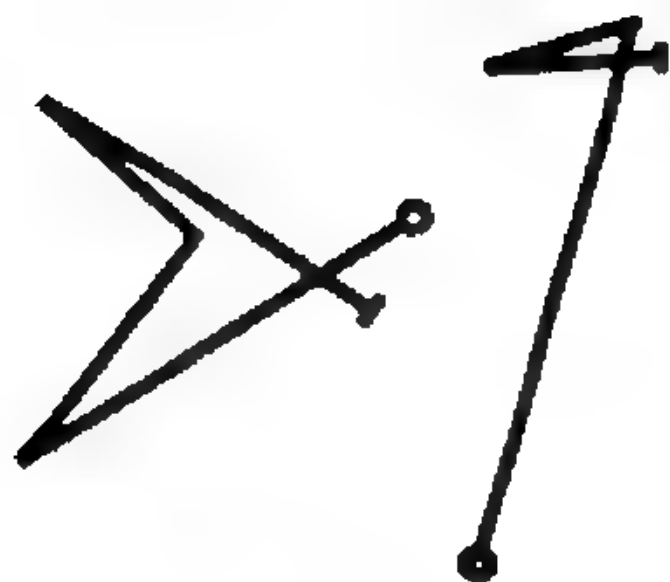
15) Paint the God Names and Motto in a very bright flashing green.

16) When the paint has cured completely, apply acrylic varnish.

The symbols to be painted on the Fire wand are:

- I) THE GOD NAME: YHVH TZABAOth
- II) THE ARCHANGEL: MICHAEL
- III) THE ANGEL: ARAL
- IV) THE KING: SERAPH
- V) THE RIVER OF PARADISE RELATING TO FIRE:  
PISON
- VI) THE CARDINAL POINT (SOUTH): DAROM
- VII) THE HEBREW NAME OF THE ELEMENT: AESCH
- VIII) THE MOTTO

COMPLETE INSCRIPTIONS ON THE FIRE WAND



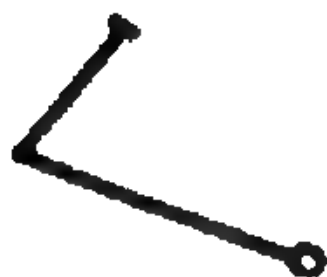
יהוה צבאות  
I. YHVH TZABAOth



מיכאל  
II. MICHAEL



אראל  
III. ARAL



שרף  
IV. SERAPH



פישון  
V. PISON



דרום  
VI. DAROM



אש  
VII. AESCH

VIII. THE MOTTO

## 6 / The Water Cup

This instrument is one which may offer real challenge to those with artistic talent. The Golden Dawn instructions suggest that any glass cup (with a stem) may be used, and paper petals applied to its sides. This seems the most aesthetically unsatisfying of all possible solutions, although it appears to have been the most common method of producing the Cup.

If there were an absolute ideal, it would be a cup cast in silver and enameled. This however, for most, is as impractical an idea as cutting a sword from raw metal.

The Water Cup has eight petals which may be painted, but which are extremely beautiful if cast or carved. Carving is the most reasonable solution for those who desire the raised effect. The Cup shown in the color illustration was an inexpensive reproduction of an eighteenth century American pewter cup, cast in relatively soft metal. The petals were cut away using a Dremel *Moto Tool* and metal files, a slow and tedious process. The same result can be achieved using a wooden cup.

Another possibility is to build the cup from clay, and then fire it with the appropriate color glazes. To do this it is necessary to have some knowledge of glazes, which change colors in firing. However, many ceramic artists and art schools will offer advice, and will fire pieces for a minimal charge.

What will be described here is the process for adapting a Water Cup from some stock metal or wood cup. Those who do



not wish to carve the petals may begin with number 5 of these instructions.

This Cup should not, incidentally, be confused with the separate Cup required for the performance of a Eucharist. It is to be used specifically for operations involving the Elements, whereas a Cup (Chalice) for Eucharistic purposes is symbolic of the Christ-Buddha center of Tiphareth. By the same token, the Air Dagger is not to be used where the Golden Dawn documents call for a knife, in the Lesser Banishing Ritual of the Pentagram. Here too, a separate tool (of no special design) is required.

1) Prepare the surface of a metal or wooden cup. If a cast metal cup is used, smooth the surfaces with emery cloth and files, as necessary. If a wooden cup is used, it is likely to have been varnished. In that case the finish must be removed with a paste paint remover.

2) Measure eight equal petals around the outside of the Cup. Draw the outline of the petals using a soft pencil.

3) *On metal*: With the electric cutting tool and a fine bit, incise over the pencil lines: *On wood*: Incise over the pencil lines using an electric cutting tool, knives, or woodcut gouges.

4) *On metal*: Slowly cut away the areas around the petals, using a large, round bit. Be careful to avoid the incised lines. Then replace the large bit with a smaller one, and cut precisely to the edge of each petal. Metal files and emery cloth of different coarseness will be required for retouching and smoothing out the cuts. *On wood*: follow the same procedure if using an electric tool, or use different wood gouges as required. A wood rasp is a very useful tool for this job. Retouch the petals with files and rough sandpaper.

The cutting may be extremely simple, or it may involve considerable detail. It should be noted that petals on a wooden cup can also be built up with *Gesso Modeling Paste*. This is a medium of ground marble chips which dries very hard, but can be carved. It is often used to decorate frames. Care should be taken to build this material up in slow coats, as it tends to crack. Cracks are, however, easily filled with more of the paste, which sands to a beautiful and smooth finish.

5) Finish the surface of the Cup using fine emery cloth on metal, and fine sandpaper for wood.

6) *On metal*: With masking tape, cover all areas of the Cup except the petals. Spray the petals with a metal undercoat and allow the paint to dry overnight. *On wood*: coat the entire Cup, inside and out, with gesso. Sand lightly when dry and apply a second coat.

7) *On metal*: color the petals with a rich enamel blue. When this is dry, add the orange borders and the inscriptions. *On wood*: with artist's acrylics, paint the inside of the Cup and the area outside the petals either a metallic silver or a light blue. Then paint the petals a darker blue and the borders and inscriptions orange.

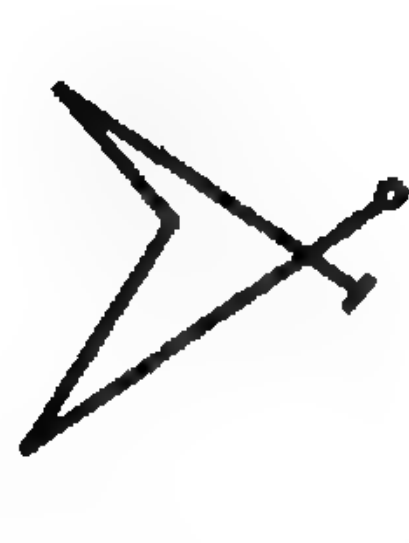
8) If using wood and acrylic colors, apply two finish coats of clear acrylic varnish when the paint has adequately cured.

The symbols to be painted on the Water Cup are as follows:

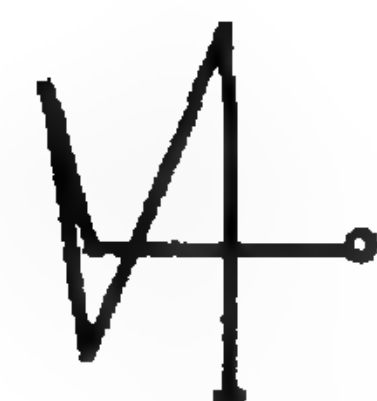
- I) GOD NAME: ELOHIM TZABAOTH
- II) ARCHANGEL: GABRIEL
- III) ANGEL: TALIAHAD
- IV) RULER: THARSIS
- V) RIVER OF PARADISE RELATING TO WATER:  
GIHON
- VI) CARDINAL POINT (WEST): MAARAB
- VII) HEBREW NAME OF THE ELEMENT: MAYIM
- VIII) THE MOTTO



COMPLETE INSCRIPTIONS ON THE WATER CUP



אלהים צבאות  
I. ELOHIM TZABAOTH



גבריאל  
II. GABRIEL



טליהד  
III. TALIAHAD



תרשים  
IV. THARSIS



גיהון  
V. GIHON



מערב  
VI. MAARAB



מים  
VII. MAYIM

VIII. THE MOTTO

## 7 / The Air Dagger

Like the Sword, the Dagger should be purchased in a 'raw' state, and painted according to the traditional instructions. Suggestions for painting the Dagger are precisely the same as for the Sword, including the use of acrylic for the wood handle, and enamel for the metal parts.

The background color is a bright yellow, while the color of the God Names and sigils is violet.

The Names to be painted on the Air Dagger are:

- I) GOD NAME: SHADDAI EL CHAI
- II) ARCHANGEL: RAPHAEL
- III) ANGEL: CHASSAN
- IV) RULER: ARIEL
- V) RIVER OF PARADISE RELATING TO AIR: HIDDIKEL
- VI) CARDINAL POINT (EAST): MIZRACH
- VII) HEBREW NAME OF THE ELEMENT: RUACH
- VIII) THE MOTTO

COMPLETE INSCRIPTIONS ON THE AIR DAGGER



שדי אל חי  
I. SHADDAI EL CHAI



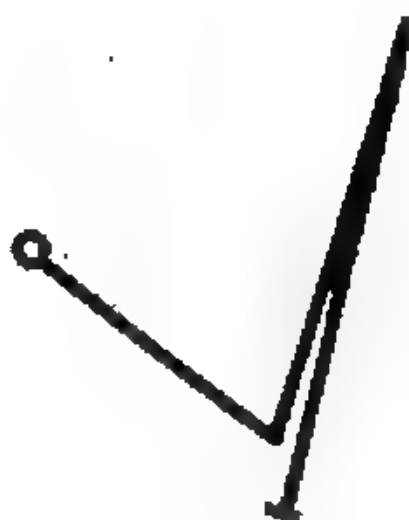
רפאל  
II. RAPHAEL



חשן  
III. CHASSAN



אריאל  
IV. ARIEL



הדקל  
V. HIDDIKEL



מזרח  
VI. MIZRACH



רוח  
VII. RUACH

VIII. THE MOTTO

## 8 / The Earth Pentacle

Of all the instruments, the Pentacle is the most easily constructed. It is nothing more than a painted disk of plywood, which can be purchased ready-cut from a hardware, hobby, or lumber dealer. If such a disk is not available, one can be cut with an electric circle-cutter attached to a drill, or by hand. If, however a circle cutter is used, it *must* be held in a drill press. Otherwise it is an extremely dangerous tool.

- 1) Using a compass, draw a circle 4-1/2 inches in diameter, on a piece of 1/2 inch thick birch or other hardwood plywood.

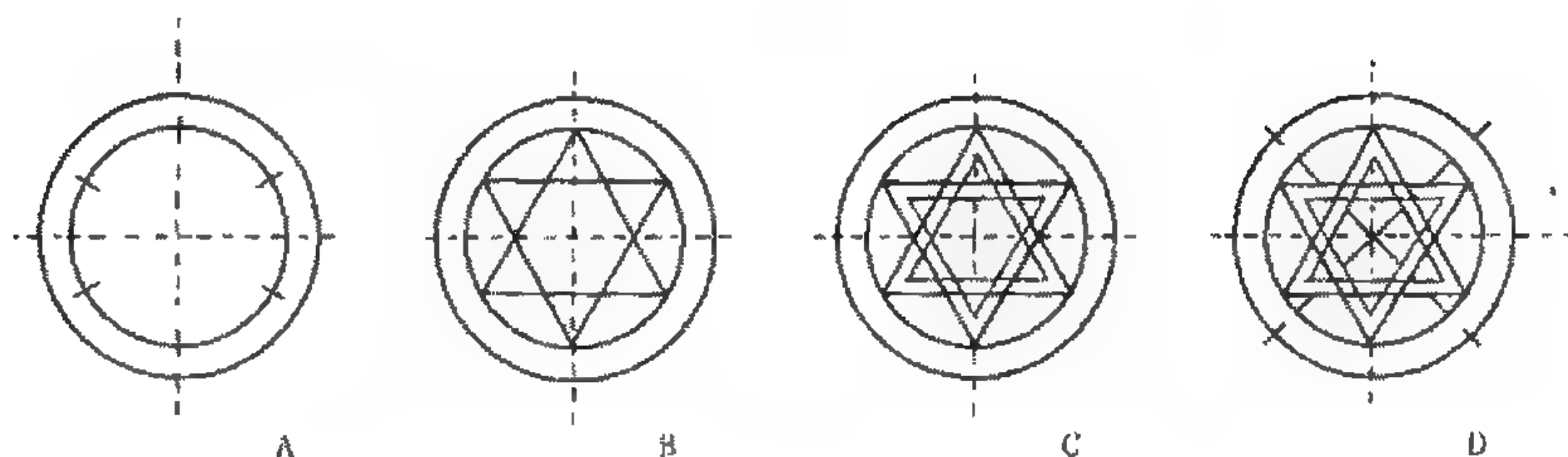
- 2) With a coping saw or electric jigsaw, cut around the outline of the circle.

- 3) Correct any imperfections in the circle with a wood rasp or file, making the edges slightly rounded if desired.

- 4) Fill any gaps or gouges with plastic wood, allow to dry, and sand very smooth.

- 5) Cover the front and back of the disk with two coats of gesso, sanding between coats.

- 6) Relocate the center hole made by the compass point, and scribe a circle around the Pentacle, with approximately the spacing shown in figure A. Then draw a † at the center of the circle. Finally, with dividers, separate the circle into six even parts, beginning at the intersection of the top of the circle and the vertical line of the cross.



7) Draw lines connecting the six points, as shown in figure B.

8) Draw a second set of lines inside the first, as shown in figure C.

9) Divide the quarters created by the cross in half, then draw lines from these points, creating a second, diagonal cross to be painted in the four colors of Malkuth. This is shown in figure D.

10) Repeat the process on the opposite side of the disk. Here some trial and error with the compass may be required to locate the exact center of the disk, as is necessary to draw the outer circle.

On both sides the central compass hole should be well-defined, sufficiently so that gesso or other paint will not fill it in completely. This is important because circular guidelines for the God Names and sigils must be drawn on top of the white border.

11) Apply the various colors:

EDGE = white

BORDER = white

HEXAGRAM = white

TOP QUARTER = citrine

LEFT QUARTER = russet

RIGHT QUARTER = olive

BASE QUARTER = black

INSCRIPTIONS = black

This can be done entirely with a small brush, but a combination of brush and ruling pen will produce the cleanest lines.

Since the *citrine*, *olive* and *russet* must be mixed from other colors, it is recommended that this be done in small pieces

of aluminum foil. The foil can be curled up into a ball, which will keep the paint from drying for some time, and available for the inevitable retouching as paint is smeared on finished parts of the Pentacle.

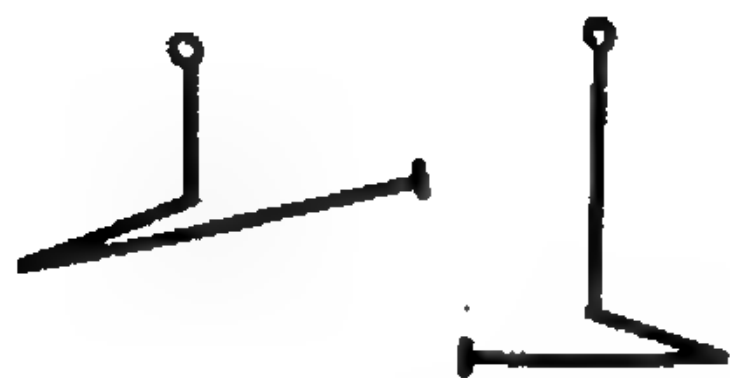
12) When the quadripartite central area and the Hexagram have been painted, use the compass to draw two light guidelines on the white outer band. The inscriptions are then painted between these guidelines. When the inscriptions are dry, the guidelines are easily removed with a kneaded eraser, or touched-up with white paint.

13) After both sides of the Pentagram have been painted and allowed to cure thoroughly, apply two coats of clear acrylic varnish. This varnish is washable, which is especially important here, as the Pentacle may pick up finger smudges over a period of use.

The Names to be painted on the Earth Pentacle are:

- I) GOD NAME: ADONAI HA-ARETZ
- II) ARCHANGEL: AURIEL
- III) ANGEL: PHORLAKH
- IV) RULER: KERUB
- V) RIVER OF PARADISE RELATING TO EARTH: PHRATH
- VI) CARDINAL POINT (NORTH): TZAPHON
- VII) HEBREW NAME OF THE ELEMENT: ARETZ
- VIII) THE MOTTO

COMPLETE INSCRIPTIONS ON THE EARTH PENTACLE



אדני הארץ  
I. ADONAI HA-ARETZ



אוריאל  
II. AURIEL



פורלאך  
III. PHORLAKH



כרוב  
IV. KERUB



פרת  
V. PHRATH



צפון  
VI. TZAPHON



ארץ  
VII. ARETZ

VIII. THE MOTTO



## Wrapping the Instruments

As each instrument is completed it should be wrapped, although this must not be done until the paint and varnish have thoroughly dried. Appreciating that the instruments are charged in their manufacture, it is advisable that they be wrapped as soon as possible to contain whatever energies have been bestowed to the piece. Of course, *an instrument must be wrapped after it is has been ritually consecrated.*

Instruments are traditionally covered with an appropriate colored silk, i.e., red for the Sword and the Wand, blue for the Cup, yellow for the Dagger, black for the Pentacle, white or gold for the Lamen and white for the Magician's Wand. Silk has some unusual insulating qualities, which serve to contain the charge held by the instrument.

Unfortunately, silk has become very expensive and few fabric stores today carry it, even in white. This being the case, linen, a natural fabric which serves almost as well, is recommended. The most practical linen is off-white rough weave, which has the added advantage of being extremely easy to sew; large stitches are not obvious.

A separate bag or hemmed cloth must be made for each of the instruments. This may be designed so that it is tied with a cord, folds over at the top, or is sealed with a snap or zipper. If, however, a zipper is used, it should be inserted in such a way that it cannot possibly scratch the paint on the instrument. Bags may also be lined, in color if desired. Any fabric, such as an inexpensive acetate, is acceptable so long as the outer material is pure linen or silk.





## *Part II / The Temple*



## 9 / The Temple

It might be safe to guess that in the Victorian era more of those pursuing esoteric ritual had their own private Temples than do today. Houses were large, and the late nineteenth century architectural aesthetic dictated that living space have a certain beehive quality. So to find an unused room and lay claim to it may not have been such a luxury.

Today apartment living and houses of two or three carefully-planned bedrooms is the norm. And to consecrate an entire room for ritual and meditative purposes may be all but impossible. Those who can prepare such an individual space can count themselves very fortunate. Those who cannot must exercise ingenuity: some may have an Altar which sits inconspicuously disguised in the corner of a livingroom. Others may choose to build an elaborate cabinet which closes off when not in use.

For the person living alone, or with a spouse who is either sympathetic or shares these convictions, finding space may be the primary difficulty. But for those with curious children or fundamentalist Christian relatives, the less that is obvious, the better.

There are four possibilities, here offered in order of their respective worth:

- 1) Set aside a separate room. Only the student should enter this room, or those who are sharing meditative and ritual

exercises. In this case a very complete Temple can be developed, with a central Altar, large columns and Enochian Tablets permanently affixed to the walls at the four Cardinal points. This is the ideal. There is really no substitute for a room which is duly consecrated and sanctified through frequent use. It becomes a silent and sacred place which effects a transformation on the person who enters it.

2) Design a large cabinet into which can be fit an Altar, columns, Banners, etc. It is best to purchase an old cabinet and adapt it as necessary. Such cabinets are readily available through antique dealers, and usually at good prices since they were made for the larger homes of the past and are now in small demand. A cabinet should be chosen which is built very low to the ground, or which can be adapted to move the Altar in and out of it easily. Many rituals require what is called *circumambulation* of the Altar, a complete circling of the Altar which invokes or banishes the Light, depending upon the direction of movement.

In the suggested design, the Pillars and Altar are on a moving platform which can be wheeled into the center of a room as necessary. The Banners of the East and West are stored beside the platform, rather than on it and are positioned according to the different rituals. The Pillars, also can be moved from the platform as required.

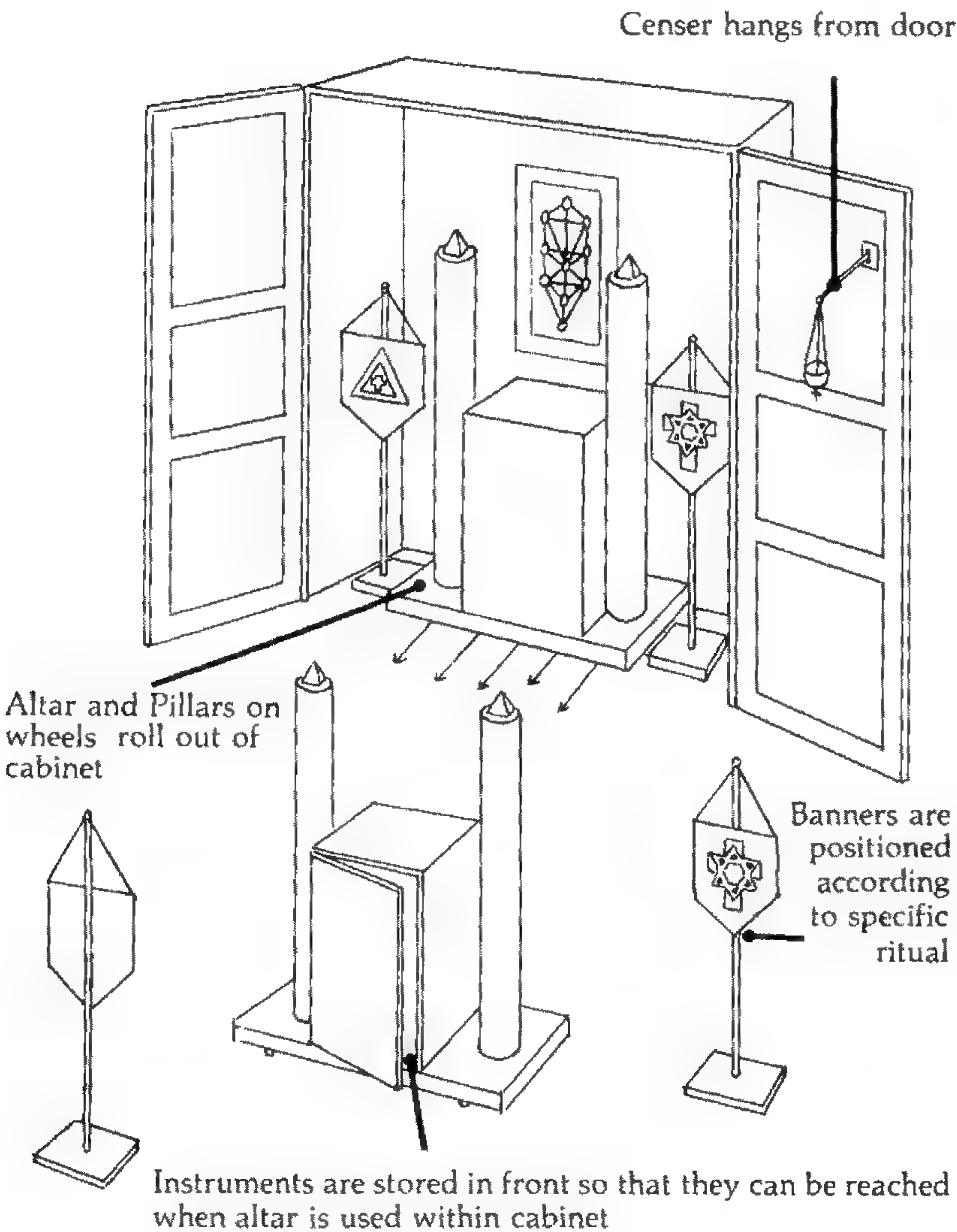
Normally, instruments are stored at the back of the Altar. However in this case, they are stored at the front to permit access when the Altar is in the cabinet.

3) An Altar may be constructed which houses all of the instruments, two miniature columns, the Banners and Tablets, and other miscellaneous equipment. Such an Altar may be wheeled in and out of a closet. Or it can be designed in such a way that it appears to be an ordinary chest, decorating a room.

4) The last suggestion is for those who have no way whatsoever to house an Altar.

It is important, at very least, that the instruments be stored in some way which is 'special.' They should not merely rest in a dresser drawer, but should be kept so that they are separated, conceptually, from daily life. It is possible to create a very effective Temple without a formal Altar, and using completely portable materials.

SUGGESTED DESIGN FOR A TEMPLE CABINET



The description which follows here is of the construction of a complete private Temple according to the Golden Dawn Tradition. While the various elements may be simplified to the

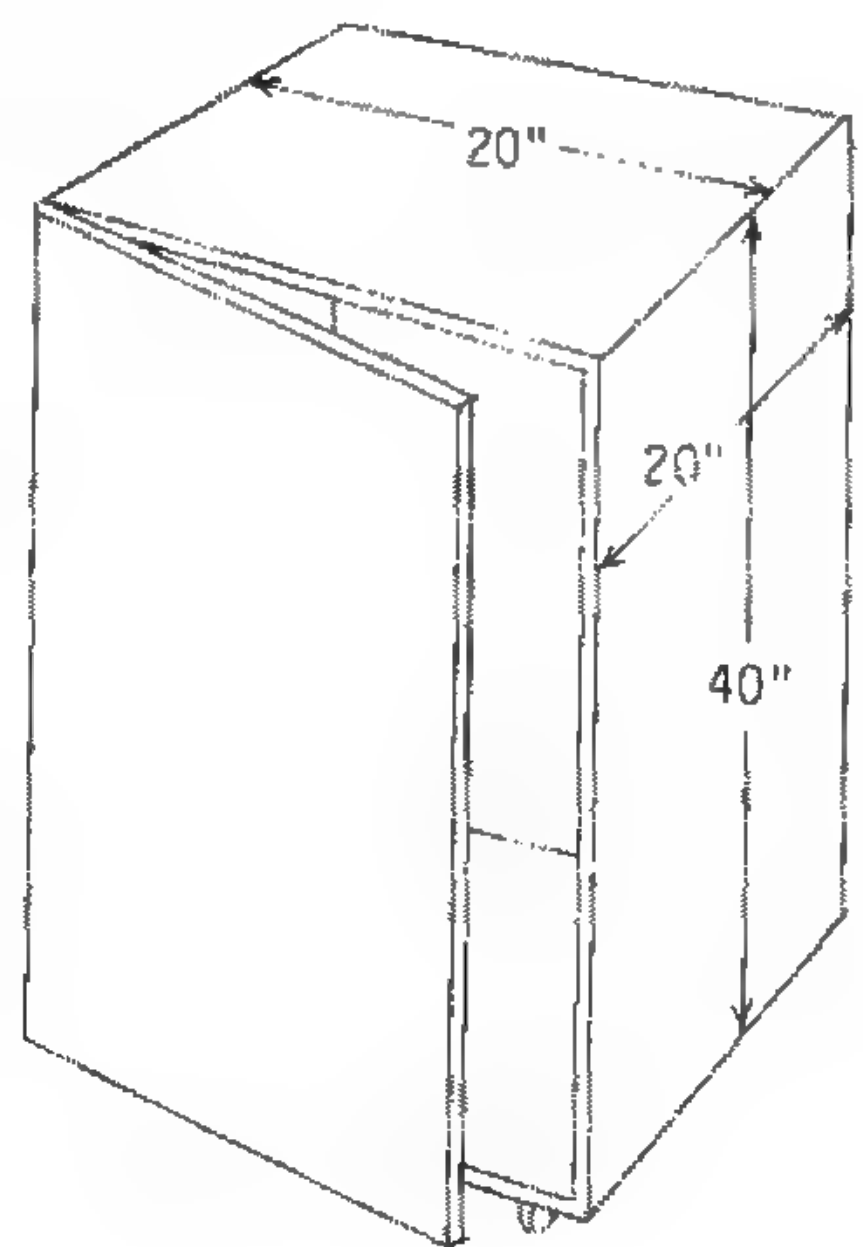
extent that they will fit into a small trunk, they may also be expanded in detail and majesty such as to be the worthy Temple of an occult order.

## 10 / The Altar

The Altar of the Mysteries is a double cube, painted black. It refers to Malkuth, the base Sephira on the Tree of Life. Thus it is understood that while it appears black overall, the four sides are to be visualized as being Citrine, Olive, Russet and Black, respectively.

It is not necessary to actually construct two separate cubes, and link them together, as the "double cube" refers to dimensions. In fact, space must be left behind the Altar for storage of the Magical Instruments, as the Sword is so long that only the full length of the Altar would contain it.

1) Cut or purchase six pieces of 1/2 inch birch plywood in the following dimensions:





2) Drill screw holes, and gouge areas for counter-sinking (insetting of the screw head). Then assemble the pieces with screws and wood glue.

3) Attach the door with hinges and a small latch.

4) Attach wheels on flat plates to the bottom.

5) Fill the counter-sunk screw holes with plastic wood, patch as necessary and sand when dry.

6) Apply undercoat, then one or more coats of black enamel.

## *Altar Coverings*

It is not necessary that the Altar be covered, but a cloth of some sort will make it significantly more attractive. Moreover, a student who has no Altar may find an Altar cloth, whether simple or elaborate, very useful.

The more the Temple, whether a permanent room or entirely portable, is set apart, the more effective it becomes. And the student who lavishes attention on the preparation of a cloth will find that it lights up the environment whenever it is unfolded and spread onto the simplest table. The cloth, in effect, becomes the Altar.

The Banners of the East and West, to be presently considered, are a difficult craft project, even for those with considerable sewing experience. Such is not the case with an Altar cloth, which can be nothing more than a large black square with hemmed edges. The most ornate borders of gold are available by the yard in fabric stores, and are quite inexpensive and easily applied by hand or by machine.

The Altar illustrated in color has two coverings, both of which are simple black material with stock border decorations applied. The Rose of Five Petals, surrounded by the emblems of the Four Kerubim, is hand-embroidered and represents one individual approach to the Altar covering. A black cloth with no decoration whatsoever is acceptable, but the more attention to detail, the more there is a psychological separation from daily life, and the more attention is directed to the inner realities which the Temple represents.

It must never be forgotten, however, that no matter how beautiful the instruments and the Temple we create, they are

merely a means to an end. We mold these things from dust, and, like us, they will return to the dust from which they were created. They served us for a split second in eternity.

# 11 / The Lamp

Traditionally, an oil lamp burns above the Altar as a sign of the Illuminating Divine presence. Such a lamp is an extremely basic device, consisting of nothing more than a shallow bowl filled with oil and a wick. A piece of heavy string will serve as a wick, and olive oil can be burned.

The lamp pictured in the color illustration is a Temple lamp, made in France. The small cup which hangs beneath it collects oil which drips slightly over the lip. Such lamps are still being manufactured.

## 12 / The Censer

Incense is extremely important to ritual, and two forms of incense holders are required. The first is a dish filled with sand, used to hold sticks of incense for rituals such as that of the *Rose Cross*. The second is the censor, a part of the Temple furniture which hangs in the West or north-west corner of the altar.

A piece of self-starting charcoal, sold in church supply stores, is placed in the censor, ignited, and incense such as frankincense dropped on top of it. It should be added that very little charcoal is required, particularly in a small space. Large charcoal blocks intended for church use should be broken into small pieces. Naturally, care should be taken in the use of charcoal since it releases dangerous carbon monoxide; adequate ventilation must always be provided.

It might be mentioned, parenthetically, that one authority believes some of Eliphas Levi's visions to have been the result of carbon monoxide poisoning, which is certainly possible. The least that can be stated with scientific certainty is that burning vast amounts of charcoal in a small, unventilated, space may lead the occult student to a longer out of the body experience than had been planned.

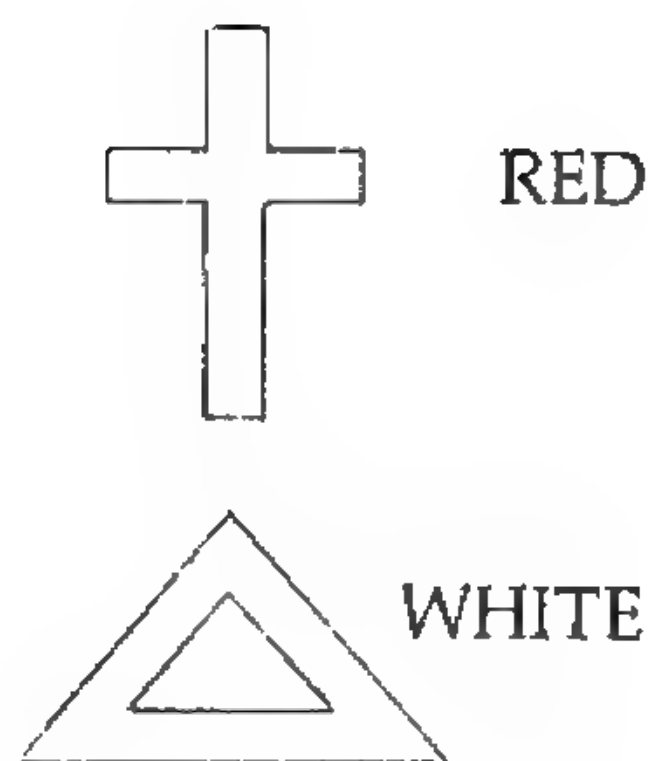
An elaborate censor can be purchased at a church supply store, although it is likely to be quite expensive. And the unfortunate fact is that most of the liturgical brass being produced today is of poor quality metal work, and execrable design. One

possible solution is that shown in the color illustration here: the censer was adapted from a modern chinese incense burner, intended to stand on a table. It was selected because of the fish on the cover, which is a Christ-Tiphareth symbol. Almost any small incense burner can be made into a censer by drilling holes in the sides, and suspending it from chains.

## 13 / The Cross and Triangle

Golden Dawn rituals which require the use of the Elemental Weapons also require a *Red Cross* and *White Triangle* at the center of the Altar. These can be cut from thin plywood and painted, or they can be made from cardboard. A more ambitious possibility is that they be sewed onto the center of a black altar cloth, using red and white fabrics, or embroidery.

The Cross and Triangle should be no larger than three or four inches high since, when all of the instruments are placed around them on the altar, there may be little space left.





## 14 / The Pillars

Traditionally the Pillars stood at the doorway of the mysteries in the ancient Temple of Solomon. They represent the dualities of the earthly condition, brought into balance by the candidate who stands between them.

One is white and the other black. Both are crowned with a red triangle and pyramid having a light with a hidden source. The black Pillar is painted with white Egyptian figures, a black lotus and a black cube at its base. The white Pillar is painted with black Egyptian figures, a black lotus, and also rests on a black cube.

This describes the perfect Golden Dawn column. Those shown in the color illustration, however, are a simplified version having neither the base, inner light, nor hieroglyphic inscriptions. The Pillars may be either the most complex pieces of furniture in the Temple, or the most simple.

A Pillar may be nothing more than an upright piece of wood, round or square, on a flat base. It may be as small as two or three feet if space presents a problem.

### *The Complete Golden Dawn Pillars*

From the standpoint of Temple construction, Americans have one special advantage, resulting from their countrymen's mania for destroying old buildings. In every major city nineteenth century row houses, with wood porches, are either being



systematically razed or renovated to exclude the porch. This means that piles of large wooden pillars are usually available in salvage yards, and at virtually give-away prices. The columns illustrated here began life on a Victorian porch in Baltimore.

Such pillars can be constructed, but that is a tedious and costly task. Of course, if a Temple is to be constructed for the use of an occult Order, cost may be less of a consideration, and designs should be turned over to a master cabinet-maker. A Temple for group work should come as close to the ideal as possible.

If old pillars are located, a number of potential problems exist. First, a great many such pillars have been stored in outside yards, and are badly rotted. These should be avoided. It will also be discovered that most of these pillars are made of hardwood strips, grooved together, and nailed to a porch base. Not only are they extremely heavy, but there is a likelihood that there will be a number of dangerously protruding, or slightly hidden, rusty nails. Carry a pair of pliers into a scrap yard, and expect to have to pull out some nails before transporting the old pillars.

The greatest difficulty is that old pillars generally have many decades of paint on them, invariably chipping off. Cleaning this paint to bare wood requires a large amount of heavy duty paint remover, and many hours. Moreover, the solvents required to handle such caked paint are extremely toxic and volatile, so work should be done out of doors if at all possible.

The most practical solution is to take the pillars to a company which specializes in removing paint from old furniture where they can be dipped or sprayed with solvent.

Beginning with clean columns, whether renovated, or built new:

- 1) With 3/4 or 1" birch plywood, construct two cubes (leave the bottoms open) and attach the columns securely. If using new columns, work with several very long screws and an industrial-weight epoxy cement. Older columns may be more difficult to attach, because of the unevenness of the bases, and because deterioration of the wood may have occurred. Some ingenuity will certainly be required.

- 2) Once the Pillars have been securely attached to the bases, fill any gaps with plastic wood. If the holes are par-

ticularly large, build up the filler, allowing several days of drying between each coat. Plastic wood may appear to be completely dry but, if applied in thick coats, may shrink disastrously over a period of weeks.

3) Sand the Pillars, first with a rough, and then with a smooth paper.

4) Build the triangular capitals with their tetrahedral tops. The triangles should be cut from one inch pine; while the tetrahedrons can be constructed from thin plywood or very heavy cardboard and paper tape. If plywood is used, the sharp edges should be filled with plastic wood or gesso modeling paste, and smoothed with files and sandpaper when thoroughly dry. The process may have to be repeated several times to produce a perfect tetrahedral form.

If desired, a small lightbulb can be incorporated into the capital, but care must be taken that there is no great build up of heat, which could present a fire hazard.

5) Coat the Pillars with a white priming paint.

6) Carefully measure, and draw the Lotuses at the bottom of each Pillar.

7) With enamel, paint one column black, and the other white.

8) Paint the Lotus flowers in the opposite color. Small brushes will be required for accurate outlines.

9) Paint the bases black, and the capitals red.

10) Paint the hieroglyphic designs as given in the following pages, black on the white Pillar and white on the black Pillar.

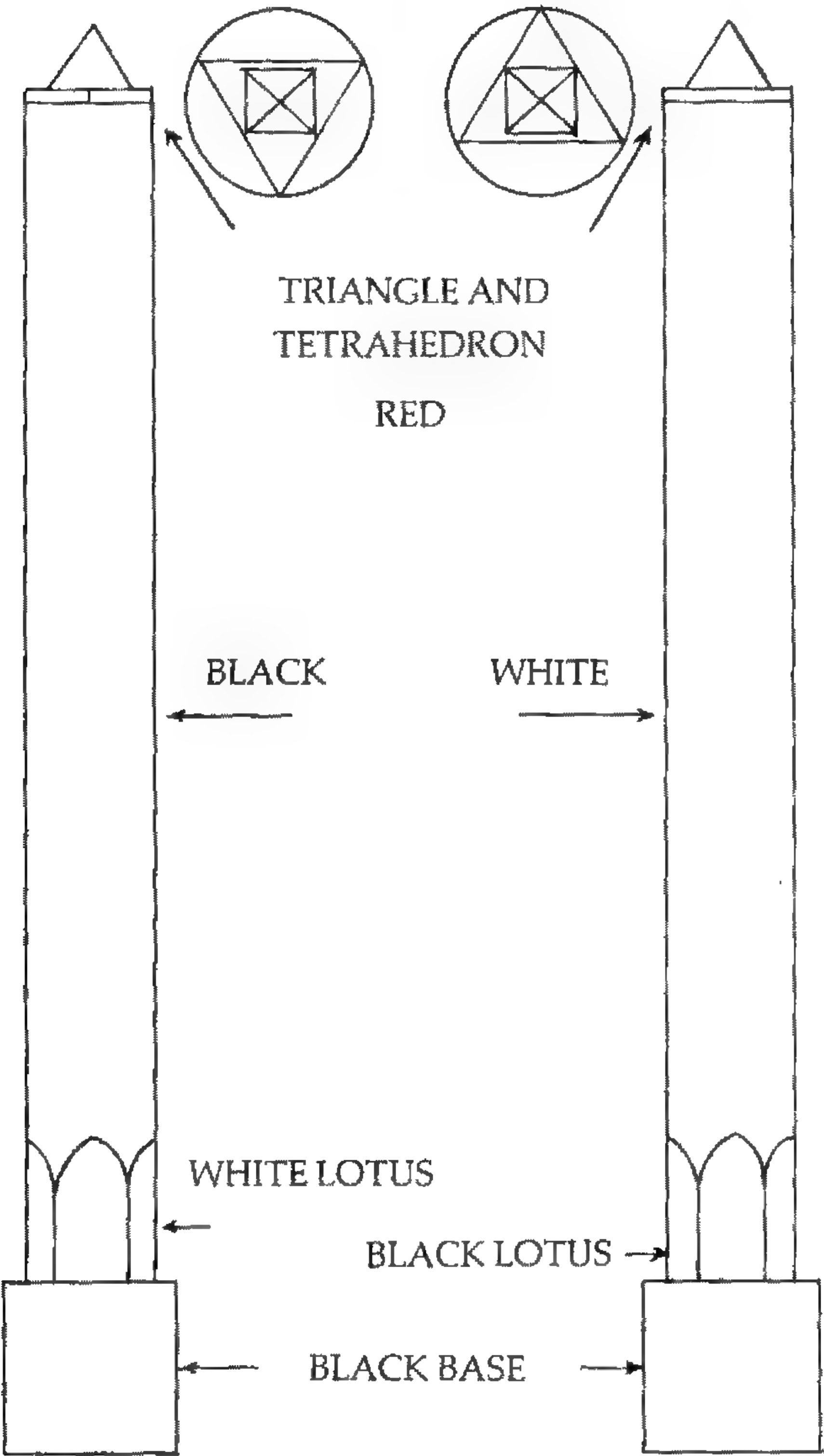
These are vignettes from the seventeenth chapter of the *Book of The Dead*, illustrations intended to accompany the "Hymn to the Rising Sun," slightly modified by the Order for use on the columns. The illustrations here are traced exactly from a paper written by Brodie Innes, entitled *0°-0° Grade of Neophyte Side Lecture No. 2A, Appendix to the Lecture on the Pillars* (Carr P. Collins, Jr. Collection, the Bridwell Library, S.M.U., Dallas, Texas). The lecture mentioned was a brief one by Mathers who, with Brodie Innes, founded the A-O after the collapse of the Golden Dawn *Isis-Urania* Temple in 1900.

These vignettes are very complicated, and few may choose to make the effort of painting them on the Temple Pil-

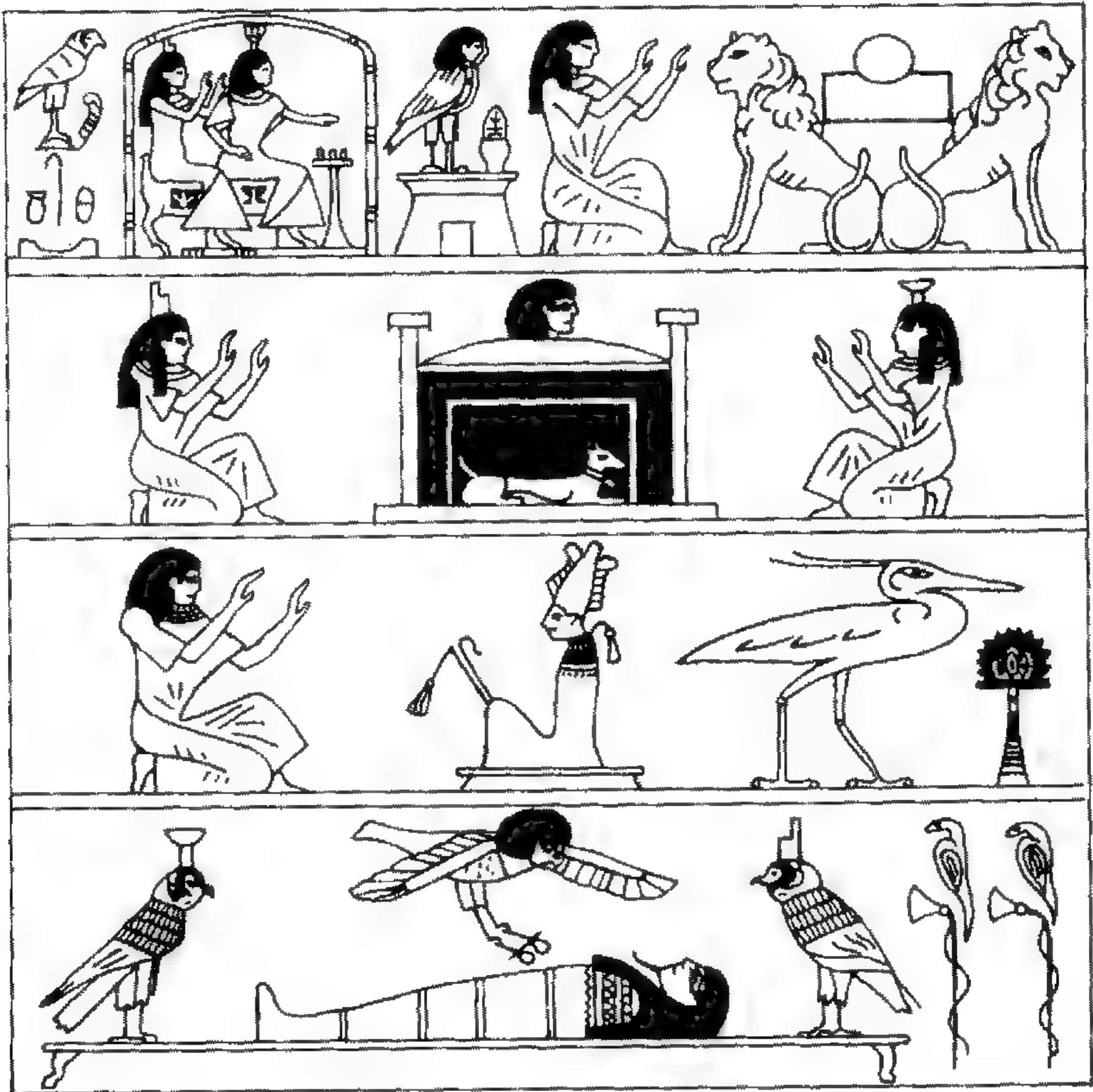
lars. They are included for the benefit of individuals or groups who are following the Golden Dawn methods down to the most careful detail.

BLACK PILLAR

WHITE PILLAR

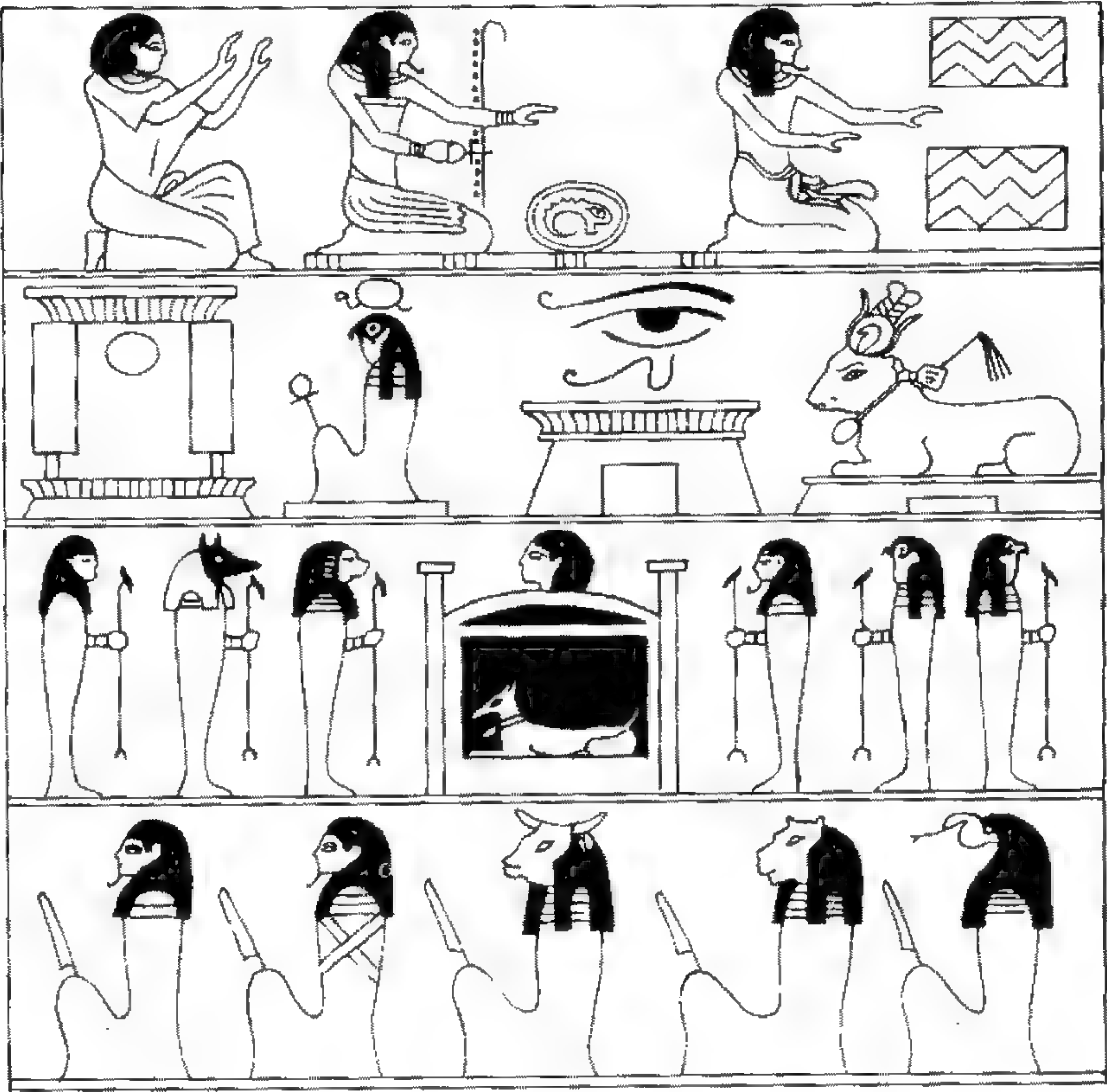


WHITE COLUMN: UPPER SECTION OF EGYPTIAN SYMBOLS

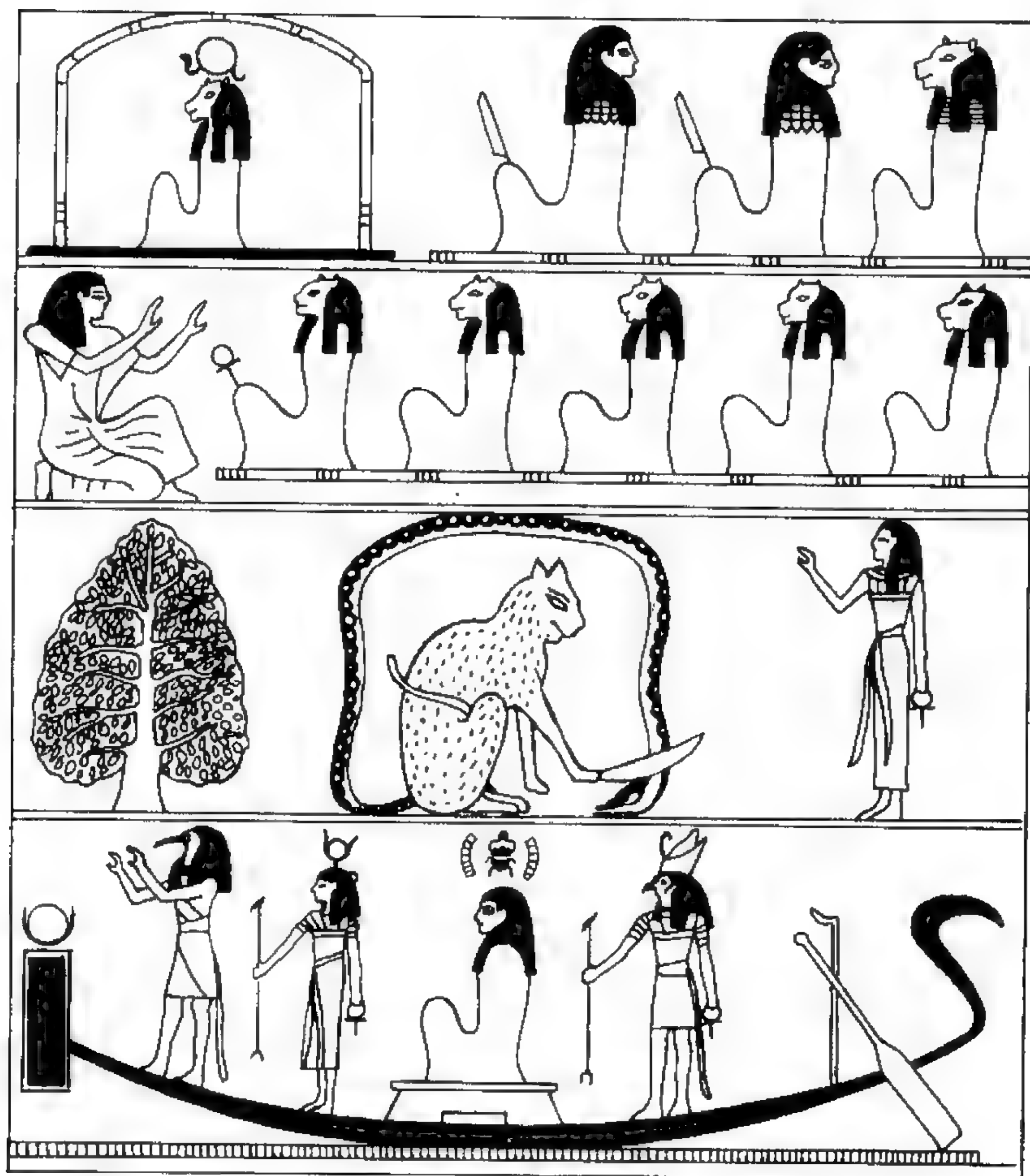




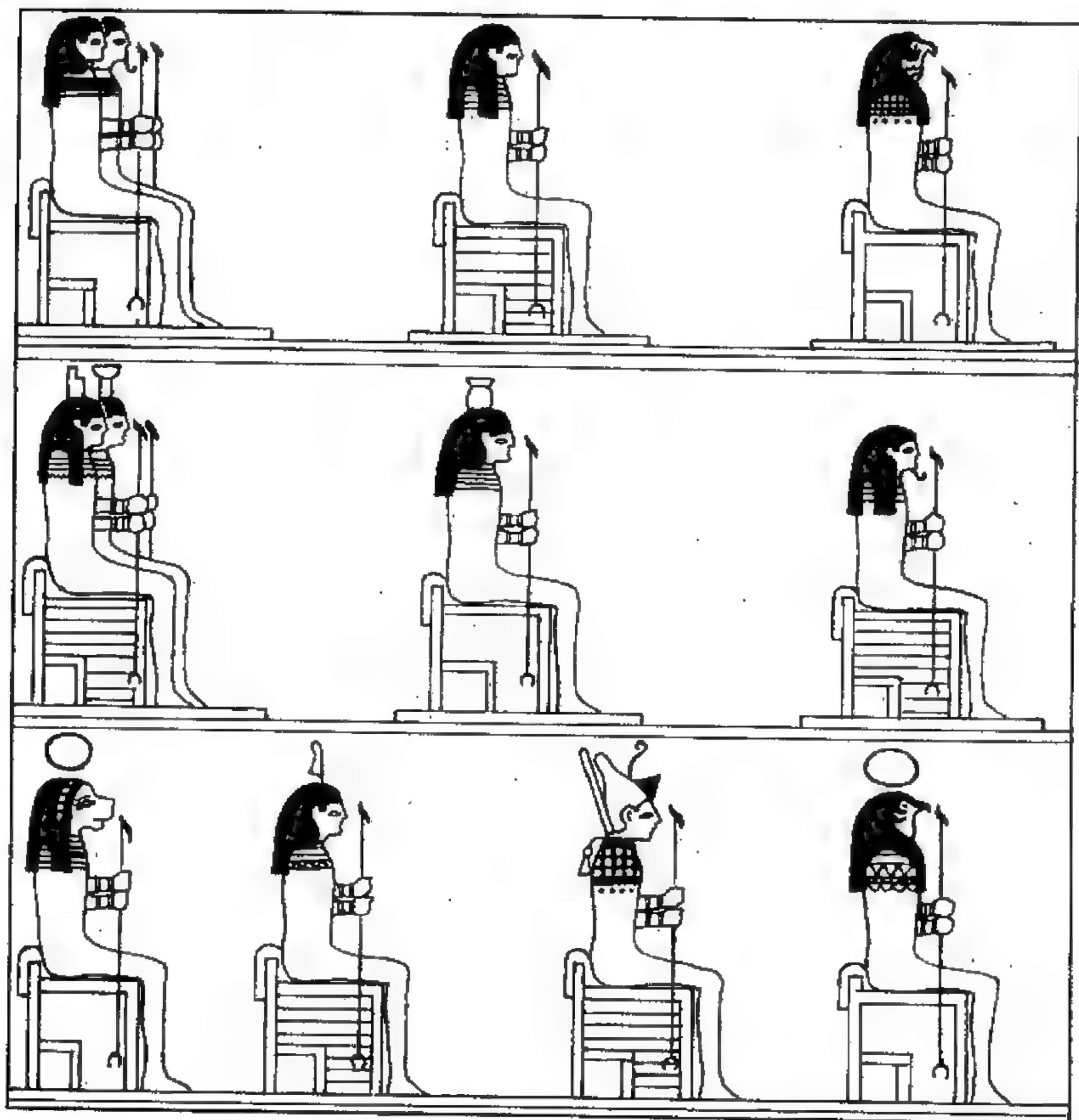
WHITE COLUMN: CENTRAL SECTION OF EGYPTIAN SYMBOLS



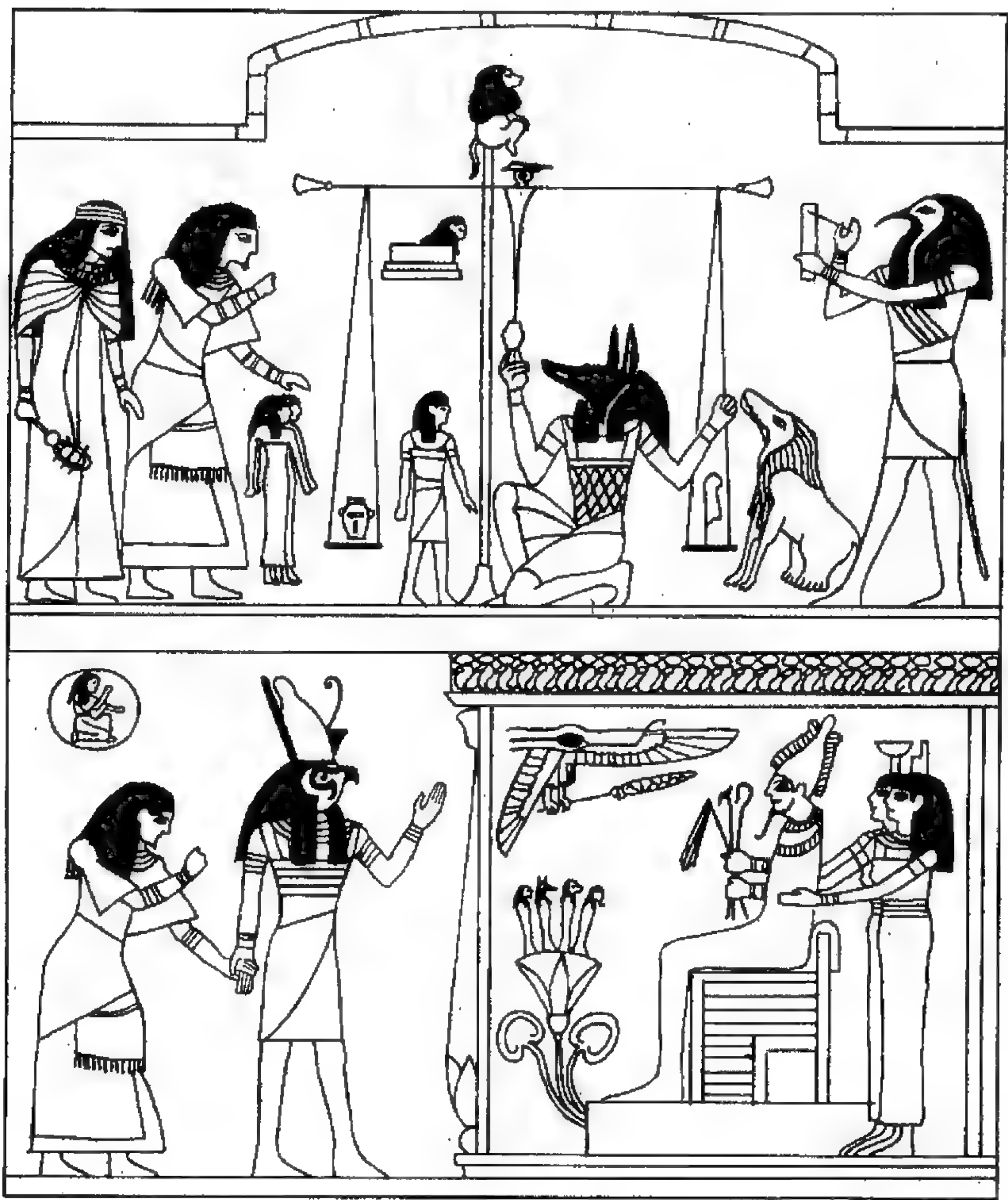
# WHITE COLUMN: LOWER SECTION OF EGYPTIAN SYMBOLS



BLACK COLUMN: UPPER SECTION OF EGYPTIAN SYMBOLS



BLACK COLUMN: LOWER SECTION OF EGYPTIAN SYMBOLS







## 15 / The Temple Diagram

This diagram may be described as a complete "Ceremonial" Tree of Life. On each of the Sephira the appropriate God Names are painted in their opposite or *flashing* color, as is also found on the instruments. The principle of flashing colors is very basic to the Golden Dawn system. The Qabalah, of which the Tree of Life is the primary symbol, involves opposites, and the desire to bring those opposites into perfect balance. A force functions properly only when its opposite and balancing force is present. Thus the colors, which are the mundane aspects of the actual spiritual forces, are activated in the presence of their opposites.

The Sephiroth are painted in the colors of *Briah*, while the paths are painted in the colors of *Atziluth* providing a balance of masculine and feminine in the same symbol.

The following are the proper colors of the Sephiroth and Paths, the opposites of which can be easily derived from a color wheel, as has been previously noted. The full scales of color in the four worlds, as apparently developed by MacGregor Mathers, can be found in Regardie's *Golden Dawn*, and Crowley's 777.

### SEPHIROTH:

1. White brilliance
2. Grey
3. Black

4. Blue
5. Scarlet Red
6. Yellow (gold)
7. Emerald
8. Orange
9. Violet
10. Citrine, olive, russet and black

PATHS:

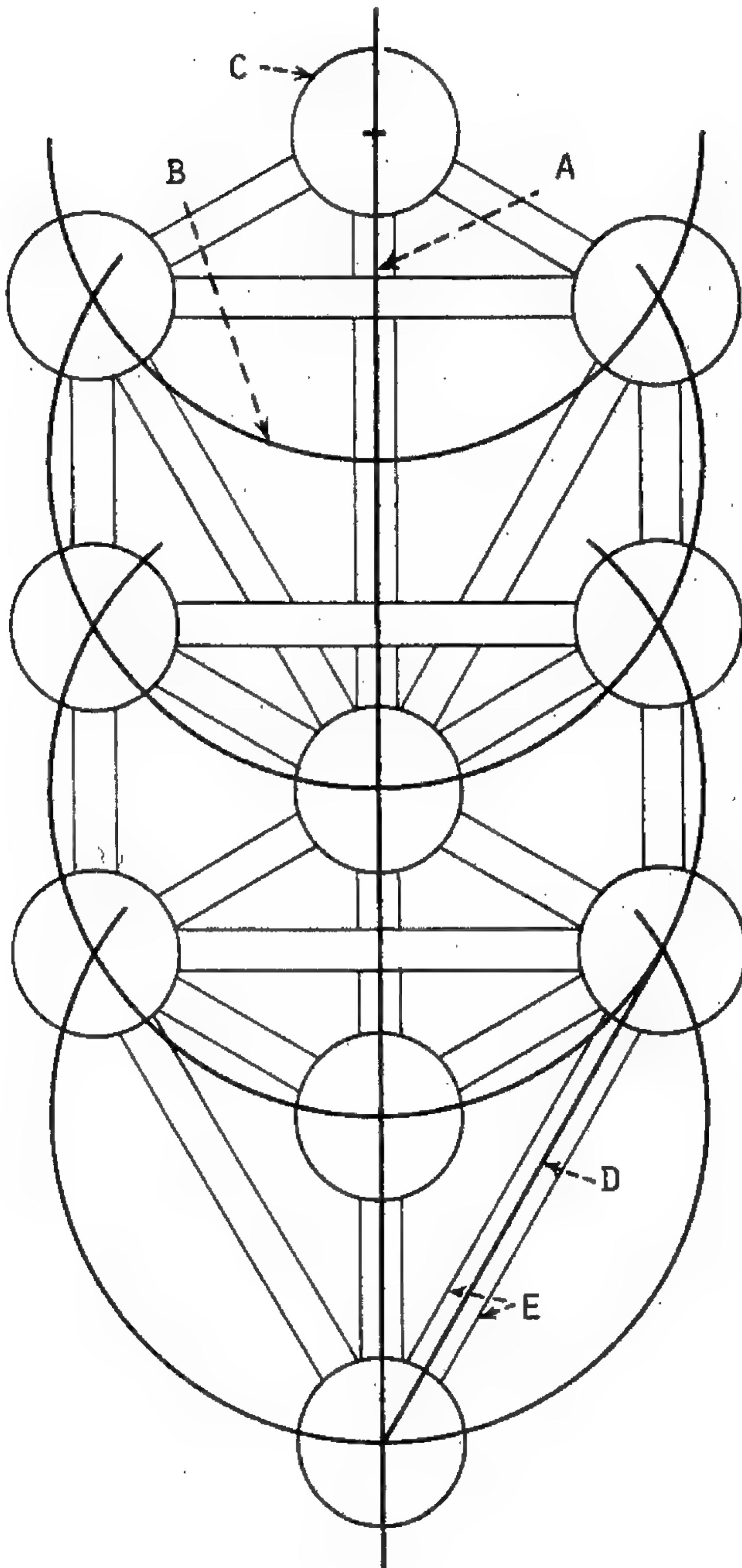
11. Bright pale yellow
12. Yellow
13. Blue
14. Emerald Green
15. Scarlet
16. Red orange
17. Orange
18. Amber
19. Yellow, greenish
20. Green, yellowish
21. Violet
22. Emerald Green
23. Deep blue
24. Green blue
25. Blue
26. Indigo
27. Scarlet
28. Violet
29. Crimson (ultra-violet)
30. Orange
31. Glowing orange scarlet
32. Indigo

## *Constructing the Diagram*

1) From birch plywood of any thickness cut a panel to some standard size, such as 9 x 12, 11 x 14 or 16 x 20. Any size panel would suffice, but a standard size permits mounting in an inexpensive stock frame.

2) Seal the front and back of the panel with gesso. Allow to dry and sand lightly. Repeat the process with a second coat.

# TREE OF LIFE CONSTRUCTION



3) Using a pencil, ruler and compass, *construct* a Tree of Life. This is very simple, though a surprising number of even experienced students are unfamiliar with the method:

A. As shown in the illustration following, measure from both sides of the panel, and draw a central line from top to bottom.

B. Determine the length of the Tree on the basis of the space desired above and beneath it. Set the compass to a measure which is  $\frac{1}{4}$  the total intended length of the diagram. For example if the Tree is to be eight inches long, set the compass to two inches.

Set the point of the compass at the top of the line and draw a circle. Then bring the compass point to the area of intersection of the central line and circle just drawn. Repeat this procedure until there are four intersecting circles. This establishes the precise centers of the Sephiroth.

C. Draw the Sephiroth with the compass. The proper diameter of each Sephira is one half the original compass line (B; if two inches, the diameter of the circle would be one inch).

D. Draw Path lines between the center points of the Sephiroth.

E. Using dividers or a ruler, establish the width of the Paths by measuring two points equidistant from the central line (D). Note that the width of the Paths must be such that five Paths will fit at the top of the sixth Sephira, Tiphareth. With a ruler, draw the outside line on each Path.

4) Paint the Sephiroth using artist's acrylics. Outlines are most easily established by using water-thinned paint in a compass.

5) Paint the Paths. Here, too, outlines can be established using a ruling pen and thinned paint. Since there are so many colors, and since retouching may be necessary, it is advisable to mix the paints in small bits of aluminum foil.

Try to paint all Paths requiring the same color at one time.

6) Add the Serpent, which touches each Path (see full-color Temple illustration).

7) Add the God Names, to the Sephiroth, and the Hebrew letters to the Paths.

8) Allow the paint to cure, and varnish as usual.

# THE DIVINE NAMES ATTRIBUTED TO THE SEPHIROTH

No. OF SEPHIRAH	DIVINE NAME (Atziluth)	ARCHANGELIC NAME (Briah)	CHOIR OF ANGELS (Yetsirah)
1. Kether	Eheieh אהיה	Metatron מטטרון	Chayoth ha-Qadesh חיות הקדש
2. Chokmah	Yah יה	Raziel רזיאל	Auphanim אופנים
3. Binah	Yhvh Elohim יהוה אלהים	Tzaphkiel צפקיאל	Aralim ארלים
4. Chesed	El אל	Tzadkiel צדקיאל	Chashmalim חשמלים
5. Geburah	Elohim Gibor אלהים גבור	Kamael כמאל	Seraphim שרפים
6. Tiphareth	Yhvh Eloah Vedaath יהוה אלוה ודעת	Raphael רפאל	Melekim מלכים
7. Netzach	Yhvh Tzabaoth יהוה צבאות	Haniel האניאל	Elohim אלהים
8. Hod	Elohim Tzabaoth אלהים צבאות	Michael מיכאל	Beni Elohim בני אלהים
9. Yesod	Shaddai El Chai שדי אלהי	Gabriel גבריאל	Kerubim כרובים
10. Malkuth	Adonai ha-Aretz אדני הארץ	Sandalphon סנדלפון	Ashim אשים

(From Israel Regardie, *The Golden Dawn*)





## 16 / The Banners of the East and West

The Banners are a difficult craft project because of the sharp corners required on some pieces. Their preparation demands both sewing experience and a rather meticulous sense for detail.

Material for the Banners should be very thin. It is almost impossible to fold thick cottons or other fabrics into these patterns; they invariably appear lumpy and crude. The ideal fabric, from the standpoints of availability of colors, cost and ease of construction, are acetates intended as lining materials.

To some extent, this should be considered a "cut and paste" project. Iron-on seam binding should be used to hold the pieces firmly in place before they are overstitched. It is essential that the pieces be held completely flat before final sewing, if a machine is used. Otherwise fabrics may pull to one side or the other, creating uneven lines.

The following is a technique for sewing a cross. In the absence of iron-on seam binding, the panels should be *basted* (large temporary stitches) to the background panel.

1) Iron the fabric, and on the back of it draw a cross. A soft black pencil will generally show up, even on black fabrics. A white chalk pencil available at fabric stores may also be used. Lines must be measured carefully.

2) Cut around the outside of the Cross, leaving a border of approximately  $\frac{3}{8}$  inch.

3) Cut the corners and central angles as shown in the illustration.

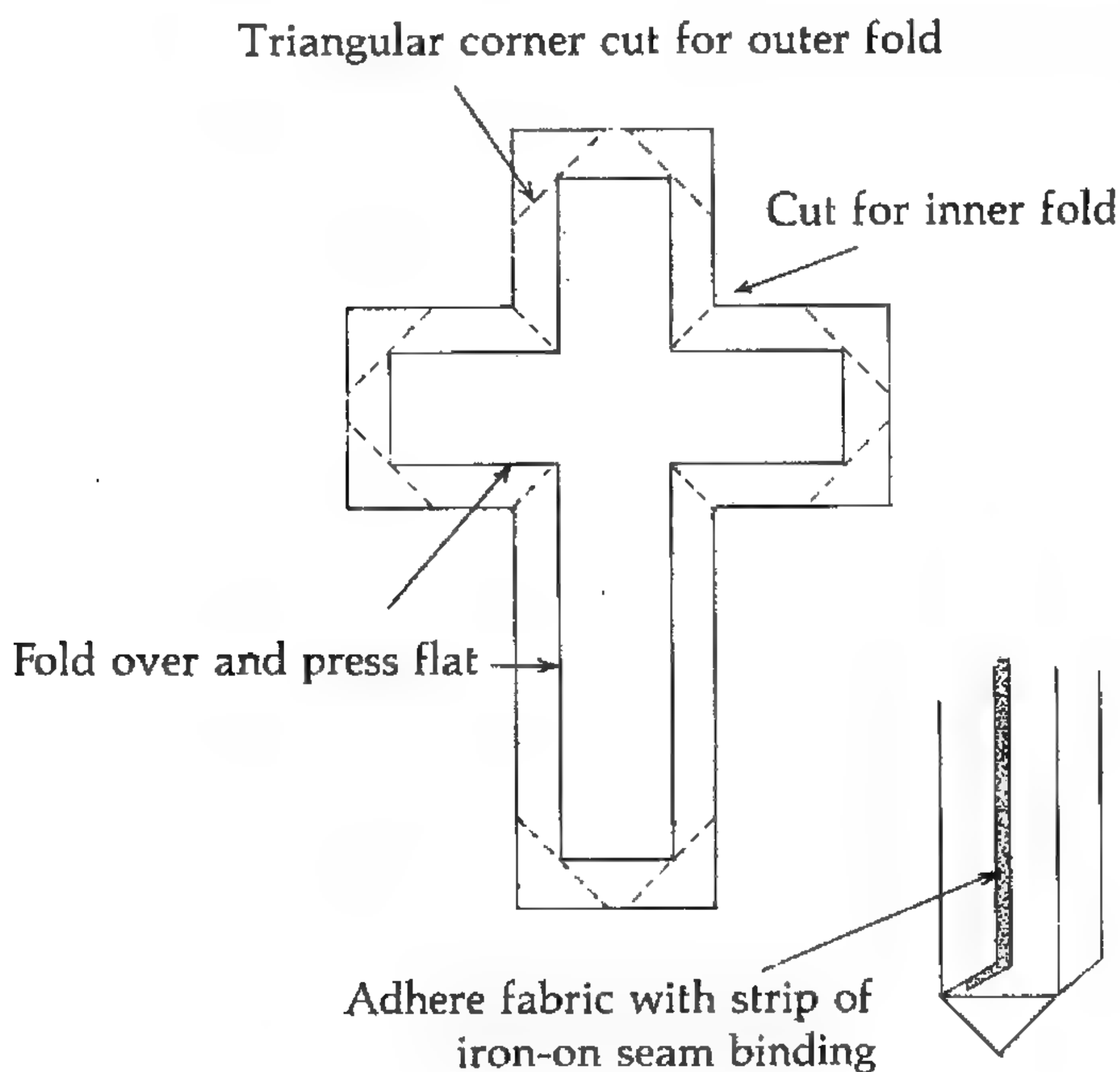


4) Apply a very small drop of white glue at each inner or outer corner point. This will keep the fabric from fraying at the point where there is nothing to be folded over.

5) With a steam iron, fold back the edges of the cross. Some materials will hold such an edge easily, but others may require tacking with a small strip of the seam binding.

6) Place the cross on the background material, with strips of seam binding underneath. Cover it with a cloth and press with a hot iron.

7) Finally, overstitch around all of the edges, keeping the lines as straight as possible.

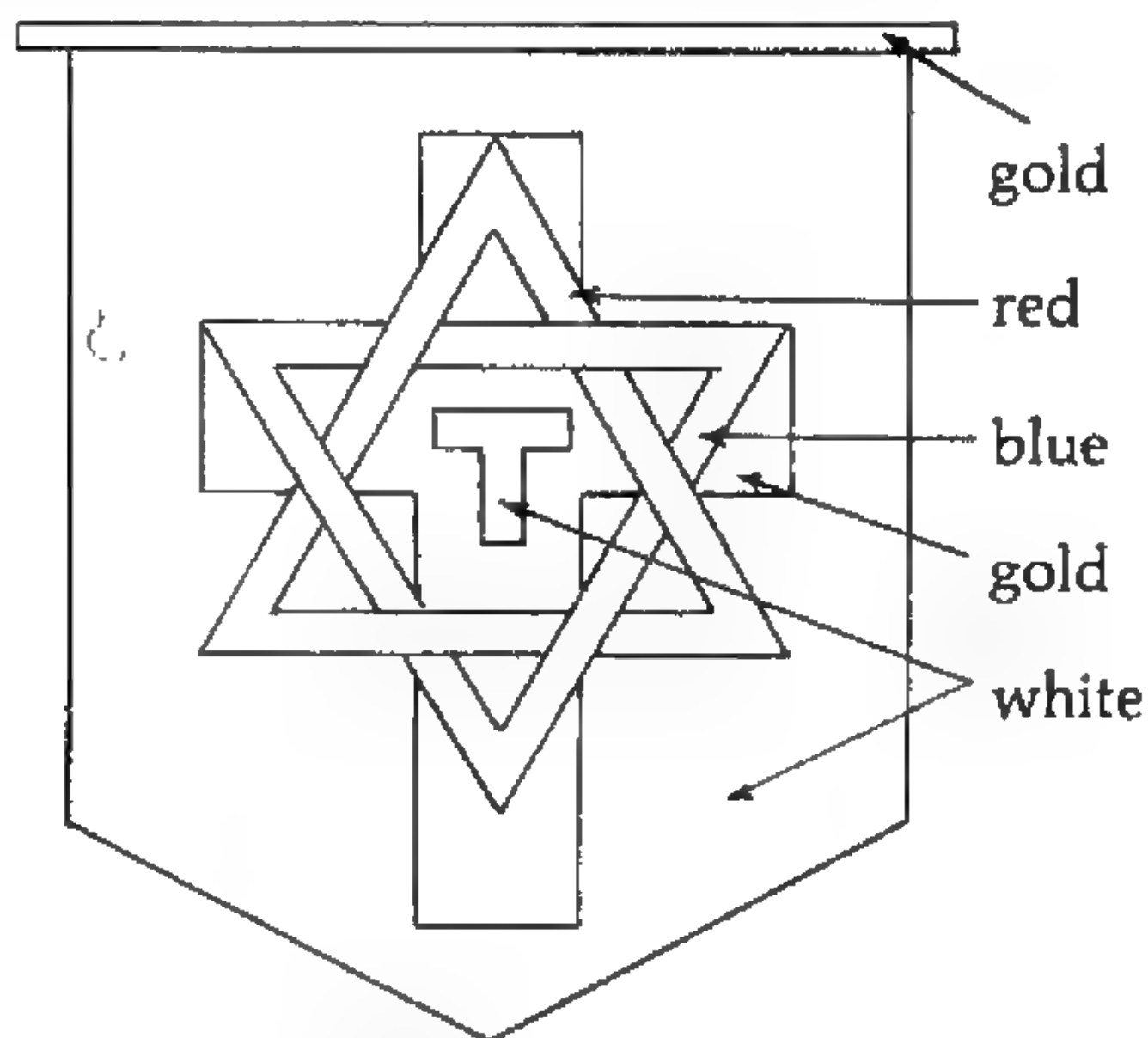


## *Hanging the Banners*

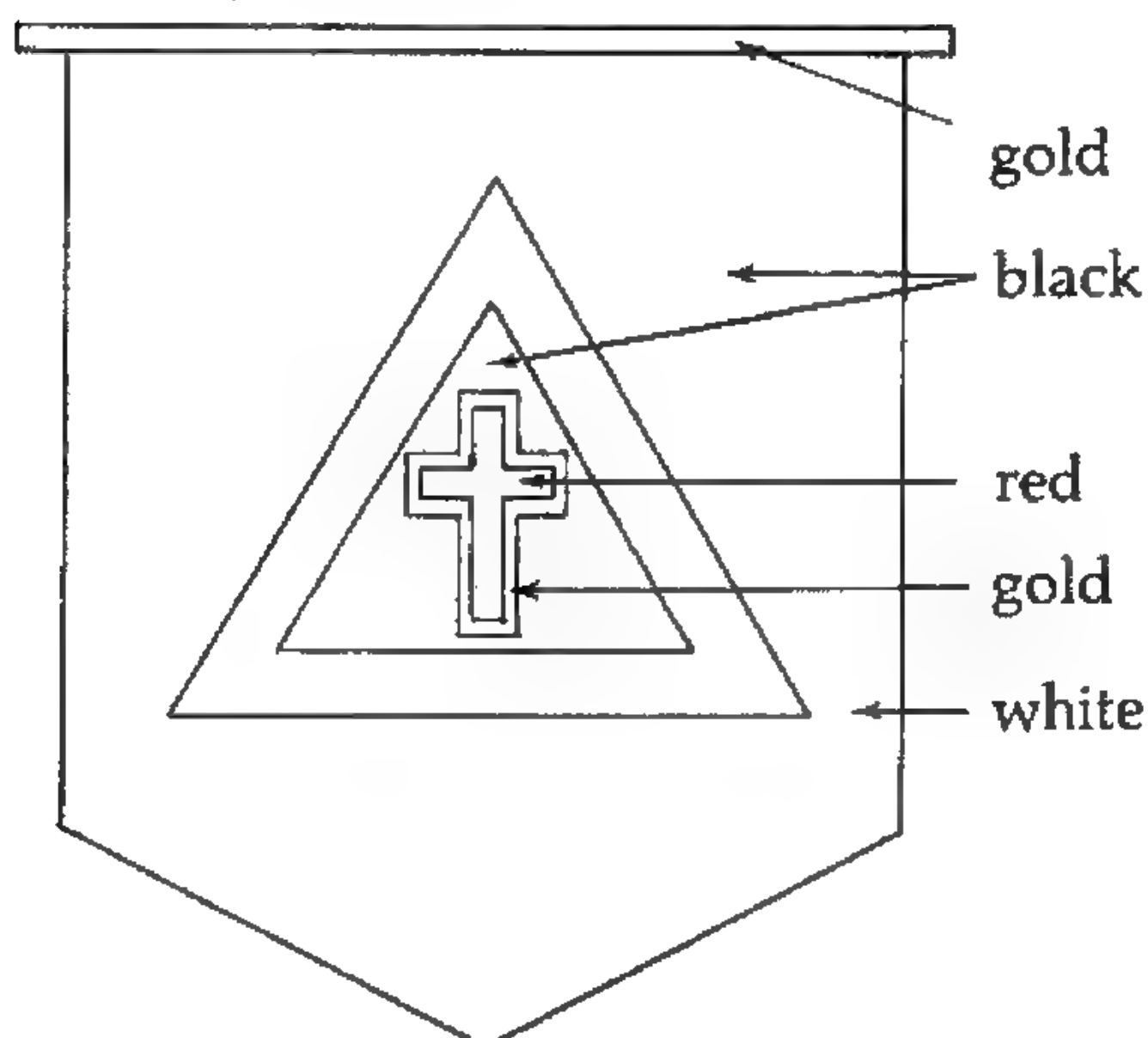
Both Banners have red tassels (available in most fabric stores) at the corners, and are hung from a gold bar. On the black Banner the bar is suspended from a black cord, and on the white Banner the cord is red. The simplest way to suspend the Banners is to attach them with heavy thread. In those illustrated, a metallic gold embroidery thread is used. The cross bars

here are nothing more than simple 3/4 inch dowel rods, with small wooden drawer pulls at the ends.

The Golden Dawn papers state merely that the stand for the Banner of the East should be white, and that of the Banner of the West black. Very simple stands can be made of round or square wood mounted on a base plate. The twisted columns of the stands illustrated here are a commercially available decorative dowel often used as curtain rods. The finials are actually curtain rod end pieces, and the bases are plywood circles sold ready-cut in many hardware and lumber stores. The Banner cord is suspended from another drawer pull.



THE BANNER OF THE EAST



THE BANNER OF THE WEST



## 17 / The Enochian Tablets

These Tablets are placed at the four cardinal points around the Temple: The Air Tablet is in the east, the Water Tablet is in the west, the Fire Tablet is in the south and the Earth Tablet is in the North.

While these Tablets, or *Watch Towers*, are essential to a completely accurate Temple, particularly for group working, there are some simple alternatives. The first is the use of the Angelic Sigils above the Tablets. These can be painted on round pieces of wood and placed appropriately. A second alternative is the use of small plaques of the *Kerubim*, either painted or carved. The Lion is Fire, the Eagle is Water, the Man is Air and the Bull is Earth.



FIRE



WATER



AIR



EARTH

The painting of the Enochian Tablets is a very time-consuming task, but well worth the effort required. Their presence in the Temple adds extraordinary vitality.

1) Cut four pieces of birch plywood to approximately 16 x 20 inches. Size is less important than the proportions, since the Tablets themselves are square, but with the addition of the Sigils, the whole is a balanced rectangle.

2) Seal the boards, front and back, with gesso, and sand lightly.

3) Paint the background color of the board. *The backgrounds of the boards should not all be painted at once.* After an acrylic (or oil) paint has cured for some time, new paint will not properly adhere to it. And since work on the Tablets is invariably slow, it is best to complete one before beginning another.

4) Carefully measure the squares on the boards, and rule them out with a soft pencil.

5) Paint the lines with a fine brush or with thinned paint in a ruling pen.

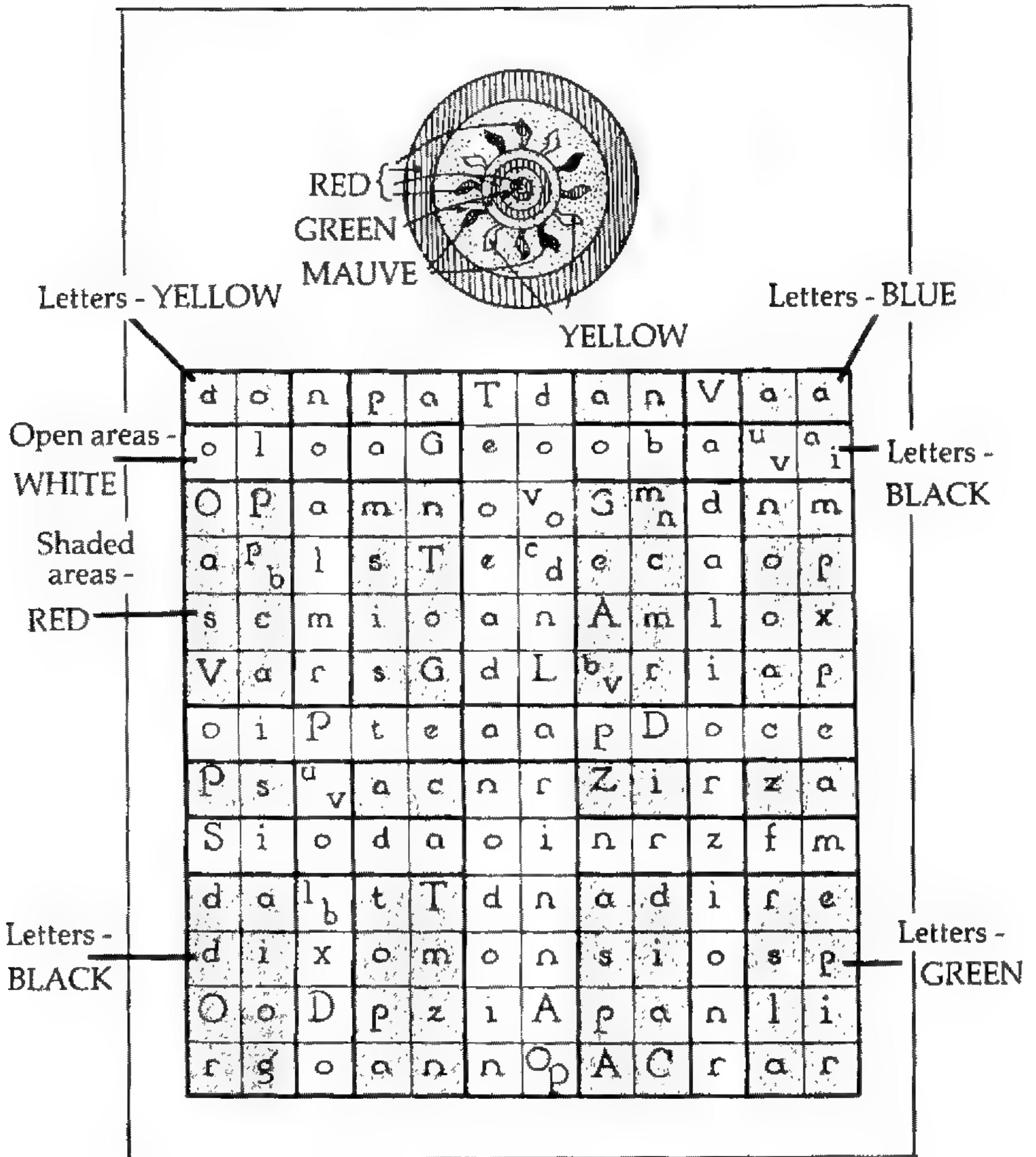
6) Paint the letters in the opposite color of the background.

7) Allow the paint to cure, and coat with clear acrylic varnish.

8) Attach picture hooks and wire to the back of the panel.

The Tablets shown in the color photograph of the Temple are arranged strictly for illustration purposes. Normally, the Air Tablet would be hung above the Altar diagram in the east. It should also be noted that these particular Tablets have the square section and the Sigils cut out and raised, which is a more interesting, though unnecessary option.


# FIRE TABLET



(Adapted from Israel Regardie, *The Golden Dawn*, Vol. 4, 1940)



WATER TABLET



BLUE

ORANGE

Letters - YELLOW

Letters - ORANGE

	T	a	O	A	d	u	v	p	t	D	n	i	m		
Open areas - WHITE	a	o	a	b	l	c	o	o	r	o	m	e	b	b	Letters - BLACK
	T	o	g	c	o	n	x	z	m	i	n	u	l	G	
Shaded areas - BLUE	n	h	o	d	D	i	a	r	l	a	a	o	c		Letters - RED
	f	p	a	t	c	A	x	i	v	o	V	s	p	x	
	S	a	a	i	z	x	a	a	r	V	r	L	e	i	
	m	p	h	a	r	s	l	g	a	i	o	l			
	M	a	m	g	l	o	i	n	L	i	r	x			
Letters - BLACK	o	l	a	a	D	n	a	g	a	T	a	p	a		
	p	a	L	e	e	i	d	x	P	a	c	n			
	n	d	a	z	N	z	x	i	V	a	a	s	a		
	r	i	i	d	P	o	n	s	d	A	s	p	i		
	x	r	l	r	n	h	t	a	r	n	a	d	i	L	

(Adapted from Israel Regardie, *The Golden Dawn*, Vol. 4, 1940)

AIR TABLET

YELLOW

MAUVE

Letters - MAUVE

Letters - BLUE

Open areas -  
WHITE

Letters -  
BLACK

Shaded  
areas -  
YELLOW

Letters -  
BLACK

Letters -  
RED


r	Z	i	l	a	f	A	y	a	t	l	p	o
a	r	d	Z	a	i	d	p	a	L	a	m	
C	z	o	n	s	a	r	o	y	a	u	b	
T	e	i	T	t	<sup>z</sup> x	o	P	a	c	o	C	
S	i	g	a	s	o	<sup>n</sup> m	r	b	z	a	h	
f	m	o	n	d	a	T	d	i	a	r	i	
o	r	o	i	b	a	h	a	o	z	p	i	
<sup>t</sup> e	N	a	b	<sup>r</sup> o	V	i	x	g	a	<sup>e</sup> z	d	
O	i	i	i	t	T	p	a	l	O	a	i	
A	b	a	m	o	o	o	a	C	<sup>u</sup> v	c	a	
N	a	o	c	O	T	t	n	p	r	<sup>u</sup> a	T	
o	c	a	n	m	a	g	o	t	r	e	r	
S	h	i	a	l	r	a	p	m	z	o	x	

(Adapted from Israel Regardie, *The Golden Dawn*, Vol. 4, 1940)



EARTH TABLET

RUSSET



CITRINE

OLIVE

BLACK

Letters - YELLOW

Letters - BLUE

Open Areas - WHITE

Letters - BLACK

Shaded Areas - BLACK

Letters - GREEN

Letters - RED

b	O	a	Z	a	R	o	p	h	a	R	a
u	N	n	a	x	o	p	S	o	n	d	n
a	i	g	n	a	n	o	a	m	a	g	g
o	r	p	m	n	i	n	g	b	e	a	i
r	s	O	n	i	z	i	r	i	e	m	u
i	z	i	n	e	C	z	i	a	M	h	i
M	O	r	d	i	a	l	h	C	t	G	a
R	e	a	n	e	h	i	h	l	a	s	o
e	O	c	a	m	c	h	h	a	s	o	m
A	r	b	i	z	m	i	l	l	p	i	z
O	p	a	n	e	l	B	a	m	S	m	a
d	O	l	e	p	l	n	r	a	n	b	a
r	x	p	a	e	c	s	i	z	i	x	p
a	x	t	i	e	V	a	s	t	r	i	m

(Adapted from Israel Regardie, *The Golden Dawn*, Vol. 4, 1940)

## 18 / Robes

On the basis of published descriptions, it would appear that the robes of the original Golden Dawn were extremely elaborate and beautiful. Their rituals must have been art forms in the highest sense of the word.

While a very complicated robe may be produced, the Golden Dawn papers describe one which is little more than a Tau cross. This is worn with a *Nemyss*, an ancient Egyptian form of headgear.

The basic robe of the *Adeptus Minor* is of white material edged with gold. That illustrated here is of a light polyester fabric, with stock gold trim. A hood has been substituted for a *Nemyss*.

This book will not attempt to give sewing instructions on robes, in the belief that those who already sew will not need such assistance, and others are likely to hand the project over to a competent tailor or seamstress.

Whatever the design or construction of the Robe, it is a most important part of the ritual apparatus. As anyone who follows these practices will attest, the wearing of a robe effects a psychological separation from normal life. The more special the robe, the more pronounced this effect is likely to be.



## Notes on Consecration

Rituals of consecration for each of the instruments is given in *The Golden Dawn*, Volume Three. These are composite rituals, involving the use of the Pentagrams and Hexagrams, which should be studied very thoroughly before they are actually performed. The rituals presuppose familiarity with all Banishing rituals. Moreover, a student is advised to spend some time working with the exercise of the *Middle Pillar*, which will confer no small appreciation of the energies invoked in these ceremonies.

While it is not explicitly stated in the Golden Dawn documents, some consideration should be given to the astrological aspects under which the instruments are consecrated.

A ritual of consecration may be done repeatedly, thus adding to the potency of the instruments, and increasing understanding of the nature of consecration in general. These Golden Dawn rituals seem to have been developed, partially, as an attempt to teach the methods of invocation. They are unsurpassed in that regard.

Finally, it should be noted that instruments are consecrated through their repeated use.

## Recommended Reading

Israel Regardie, *The Golden Dawn*

Israel Regardie, *The Tree of Life*

Aleister Crowley, *The Equinox* (11 volumes)

Aleister Crowley, *Magick in Theory and Practice*

Aleister Crowley, *Book 4*

Aleister Crowley, *Magick without Tears*

Aleister Crowley, *777*

W.E. Butler, *The Magician, His Training and Work*

W.E. Butler, *Magic*

Francis Barrett, *The Magus*



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# the Secret Temple

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ROBERT  
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*This book is lovingly dedicated to*  
*Lily Ashley*  
*Elodie de Bosmelet*  
*Flora Wallace Sheldrake*  
*and Beatrix Williams*

concerning whom the following definition  
may be thought appropriate:  
*DIVINE [from Latin, divinus].*  
*of or pertaining to the heavenly*

## *Special Note to the Reader*

At the request of the publisher, the author has removed all footnotes and endnotes from the book and placed them onto this book's dedicated website:

[www.newscienceofheaven.com](http://www.newscienceofheaven.com)

The notes contains a great deal of additional supplementary material and information of potential interest to readers, and are not just bare references. They are therefore recommended by the author to readers wishing for further information.

The website also contains a large number of illustrations and photographs that could not fit into the book, including photos of many of the heroic scientists who battled against herd thinking and blind prejudice over the past century and a half to found and develop plasma physics as a discipline, and those who are still struggling to extend its boundaries.

# *Contents*

*Title Page*

*Copyright*

*Dedication*

*Special Note to the Reader*

*How to Use this eBook*

*Acknowledgements*

*Epigraph*

1. The Discovery of the Clouds
2. Exploring the Nature of Plasma Clouds and their Energy
3. A Brief History of Plasma Research
4. The 99 Per Cent
5. Great Balls of Fire
6. When Heaven Was Young
7. Kristian Birkeland's Miraculous Discovery
8. The Cosmic Web
9. The Cold Sun
10. Invisible Earth
11. Radiant Matter, Plasma and Plasmoids
12. Plasma Comes Alive
13. The Mysterious Case of the Dirty Gas
14. Electric People
15. How Our Bodies Emit Light
16. The 'Death Flash' and the 'Life Flash'
17. Our Plasma Selves
18. Wrapping Up the Universe

*Conclusion*

*Notes*

*Appendix 1 Article on the Kordylewski Clouds by Robert Temple and Chandra Wickramasinghe*

*Appendix 2: Peter Mitchell's Obituary*

*Appendix 3: A James Van Allen Bibliography*

*Index*

## *How to Use this eBook*

Look out for linked text (which is in blue) throughout the ebook that you can select to help you navigate between notes and main text.

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## *Acknowledgements*

I wish to acknowledge the remarkable and unswerving support of my editor, Mark Booth, who believed in this book from the beginning. Having recently retired from publishing, Mark is now lost to all the other authors who might have benefited from him as I have. I can only regret that the armies of worthy authors to come will not be able to have his firm but friendly guidance towards that ultimate end: making the book work. We authors can only repay him with our words. And these are mine.

I must thank as always my wife Olivia for her continual and devoted involvement in this book, reading it, making suggestions, expressing doubts when necessary and giving encouragement when doubts would be misplaced. I have never written a book without her help, and never more so than with this one.

I wish to thank also my very dear friend of many years, Chandra Wickramasinghe, for his vision and encouragement in exploring this exciting area of science and for co-authoring the astrophysical paper reproduced in the Appendix.

But if there be a fifth nature, such as is introduced by Aristotle, this is the essence of gods and souls

Marcus Tullius Cicero, *Tusculan Disputations*, Book I  
(Anonymous translation of 1715)

## *The Discovery of the Clouds*

In October 2019 a momentous event took place, but as sometimes happens in these cases, no one noticed at the time. This event could have consequences for humankind's view of its place in the Universe for what remains of human civilization. It could entirely change the 'job description' of Planet Earth. It means that the Earth-Moon system is significantly different than we thought it was. And it may well change everything.

So why did nobody draw the obvious conclusions? People did eventually notice the discovery, for the findings came to be widely reported as a news item, as may be seen from googling the subject. And there appears to have been an unchallenged acceptance of the existence of what was reported. But still there is a lack of any grasp of what it means. No one seems particularly concerned about it. It has been one of those news items that is exciting for a day and then forgotten, as new stories appear and 'the news caravan moves on'. The implications of this anomaly remain unnoticed, and the strange fact's potential to lead to great things is apparently unsuspected.

History often works in this way. Who could have known that a failed and penniless artist in Vienna could end up starting the Second World War? Who could have predicted that a spoiled six-year-old rich boy, who had continual temper tantrums and pounded the floor screaming insanely that his parents must obey him, would end up calling himself Lenin and creating the Soviet Union? Who could have predicted that a New York property developer who likes gold doors and had no political background would become the American President?

But what happened in October 2019 was not political. It was far more important than that.



What happened was that some astronomers saw something.

I happen to have a roving eye for anomalies; I am always on the lookout for things that don't fit with present scientific understanding. And so, in October 2019, I noticed that something anomalous had been observed by three Hungarian observational astronomers (who actually looked through optical telescopes, as so many astronomers today rarely do).

In fact, what they observed had first been seen by a Polish astronomer named Kazimierz Kordylewski in 1961. Kordylewski claimed to have seen a strange cloud at a particular location in the night sky, and he worked out that there must be two of them, another at a corresponding location in relation to the Earth and Moon. (See [Figure 1](#) ) So these soon became known as 'the Kordylewski Clouds'.<sup>1</sup> However, no one else could see them, and that, everyone presumed, was that

Fifty-eight years went by and then the Hungarian astronomers, to their great joy, observed the same cloud that Kordylewski had seen. Because it is extremely fine and emits no light it is extremely difficult to see, but they studied it as closely as they could.<sup>2</sup> It was at the exact location that Kordylewski had indicated.

This is a cloud between the Earth and the Moon, though not in a direct line of sight. It is very high above the atmosphere of the Earth and several times larger than our planet.

I was fortunate to spot the paper that the Hungarians published summarizing their research. I contacted the lead astronomer of the Hungarian team through the website [www.researchgate.net](http://www.researchgate.net), on which I am listed as she is, and asked whether they had considered any of the plasma aspects of the cloud? The answer was that they were studying the cloud 'only from celestial mechanics point of view, not from plasma perspective'.

Plasma is what this book is about. To put it very simply, plasma is matter that is made of 'incomplete or partial atoms', known as ions, and the much smaller particles known as protons and electrons. Plasma has sometimes been called the fourth state of matter, after solid, liquid and gas, but finer even than gas. We call the physical matter that is familiar to us 'atomic matter' because it is made of whole atoms, whereas plasma can also be described as non-atomic or subatomic matter.

Plasma is very familiar to us even though we may not realize it, for the Sun is entirely composed of plasma, and the stars are plasma too. Plasma also manifests itself in lightning, including ball lightning and other mysterious phenomena we will examine later. But plasma is otherwise and for the most part invisible, and we will be going into that unseen aspect of plasma a great deal as we go along.

As someone who keeps a keen eye on what is happening in plasma research, I realized that I must publish something quickly to alert people to the true significance of this cloud, since the Hungarians were not dealing with the plasma aspect.

I phoned my friend Professor Chandra Wickramasinghe, who as a retired Professor of Astrophysics is an expert on all such things, and told him about the cloud and asked if he would co-author an article for a scientific journal discussing the Kordylewski Clouds' importance from the plasma perspective. We then wrote an article together, which was published in the journal *Advances in Astrophysics* in November 2019.<sup>3</sup> It is reprinted at the end of this book as an appendix.

The fact that the Earth-Moon system contains two giant clouds that together are nine times the size of the Earth means that we might be more accurate in describing it as the two-cloud system, with the Earth and a moon thrown in. These two clouds are made of plasma.

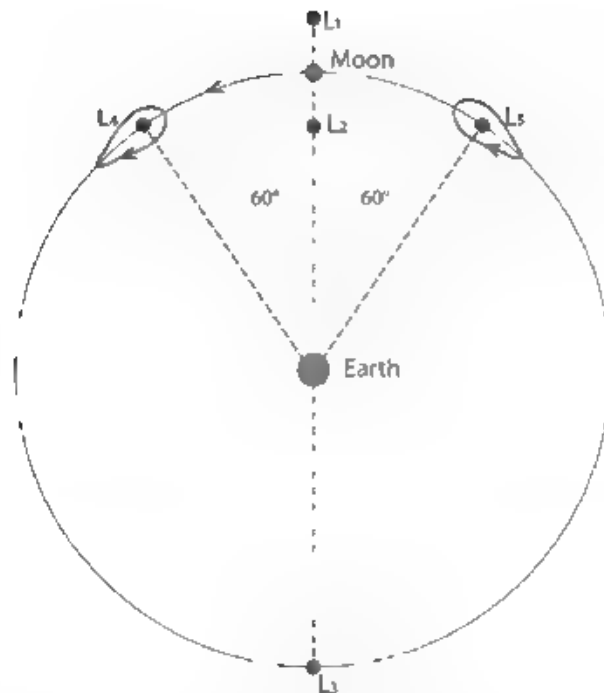


FIGURE 1 This diagram shows the locations of the 'Lagrange Points' known as L4 and L5 of the Earth-Moon system, indicating the positions of the two clouds. In this diagram, the Earth is at the centre, and the Moon is directly above it. Although distinct, bounded balls of plasma can form anywhere at modest scales (as for instance, and as we shortly see, the tiny balls of ball lightning on the Earth), for really big ones in space it is helpful for them to come to rest in spaces free of gravitational pulls, and when such a niche appears it is pretty certain that it will soon be filled by plasma which will form a ball as big as the niche allows. And that is why the L4 and L5 points are perfect homes for huge plasma clouds, for they are the only two points between the Earth and the Moon free of gravitational pull from either the Earth or the Moon. This image is not drawn to scale and the relative sizes of the bodies shown here bear no relation to their true sizes, this image is intended solely to show the geometrical spatial configuration. Seen at this scale, the Earth and the Moon would be extremely tiny or perhaps even too small to see, and as the main text explains, each of the Clouds is four and a half times the size of the Earth. (Image drawn for the author by Eric Wright)

This matters because, as I will show, there are good reasons to believe that plasma, with its ordering properties, can in certain circumstances be in some sense alive and can evolve intelligence. Because plasma is made up of charged subatomic particles, it is volatile and displays a tendency to form complex, constantly evolving patterns. This is particularly true of discrete bundles of plasma that we will call plasmoids, such as the Kordylewski Clouds. (What a plasmoid is will be explained fully later.)

Though this may surprise or even shock many readers, who may find this implausible on the face of it, I will also show that nearly all scientists in the

field believe that the Universe is more than 99 per cent made of plasma although this too has not yet filtered down to the general reading public

And if the Kordylewski plasma clouds are examples of an inorganic life that has existed for billions of years, they may, as I hope to show, have had a role in forming this planet throughout its long cosmic history. They may even have helped create organic life. Clearly these ideas taken together open up vast new and very fruitful areas for speculation on the origins of the cosmos and the role of intelligence within it.

In fact, I will be arguing that life in its basic state is inorganic, and is not made out of atomic matter. I suggest that it is made out of pre-atomic matter, namely the atomic particles, electrons and protons, and ions plasma. Thus, I am suggesting that we and all living things in the Universe, whether organic or inorganic, arise from this plasma, and that the organic state is secondary to our fundamental nature as plasma beings. I believe that we can now start to articulate 'a new science of heaven'. That is what this book is about, and that is what I propose to do.

I will also show that as well as being very new, these ideas are also in another sense very old; ancient religions and philosophers in the classical world including Aristotle formulated very similar ones. They might not have been able to apply mathematical measurement to assess the levels of complexity necessary for life and intelligence that modern physicists can now apply, but a shift in perspective caused by the new physics of plasma will cause us to reassess many ways of understanding the world previously dismissed as discredited or even cranky.

I will not enter into theological discussions and will confine myself to the new science, with the exception of a brief historical review in Chapter 6 of some early religious texts that have relevance to our subject. I believe that much of what we have previously called spiritual is really plasma, and that it exists all around us and in us. Many spiritual experiences reported throughout human history are really encounters with plasma phenomena or plasma entities. What does this mean for religions? I believe it leaves them all untouched. My primary purpose is to reconcile the 'spiritual' with the 'material', and thereby to show that the dispute between them is false. There is in fact no contradiction between them when one digests the teachings of the New Science.

## 2

### *Exploring the Nature of Plasma Clouds and their Energy*

I first got to know Professor Chandra Wickramasinghe in the 1970s along with his colleague, mentor and former teacher, Sir Fred Hoyle. It is appropriate that this should be the case, because Fred Hoyle was famous not only for being one of the world's leading astrophysicists and theoretical astronomers, but for writing the science fiction classic *The Black Cloud*, which is about an intelligent cloud in space. I will refer to that book again later.

The Kordylewski Clouds are not clouds in the usual sense of being made of water vapour and being within our atmosphere. There are two of them, as we have seen, roughly centred round two precise points in space between the Earth and the Moon.

What kind of clouds could possibly exist at these points? After all, they are in what we used to call 'outer space', so what could be there to make a cloud?

The clouds are composed not only of the subatomic particles already mentioned, but also of dust particles. That may not sound very exciting, but that is because you may well not yet know how important, complex, and incredible a dust cloud in space is.

Space dust is described thus in a 2008 technical paper:

Dust is a generic name for minute solid particles with diameters less than 0.1 to 0.5 mm. The use of a range [of size] rather than a specific number for the cut-off indicates that this upper limit for dust size is somewhat arbitrary and scientifically insignificant. A plausible argument for the range is that particles greater than these sizes are unlikely to float in the air by themselves. There is also a somewhat arbitrary lower limit of a few nanometres to distinguish dust grains from more fundamental particles, such as electrons, protons. Therefore, this choice of the 'lower' limit includes small clusters as dust.<sup>1</sup>

It is useful to read this, but it is not entirely satisfactory for us, because it speaks of dust floating in air, and there is no air in space. However, it can act as a kind of approximate guideline for us about sizes of dust particles, whether single or clustered. Astrophysicists also sometimes like to speak of dust in space as 'grains'. And although much dust is spherical, in space much of it is elongated and hence grain-shaped. Also, there is a lot of lumpy, clumpy and irregular dust in space

Not all dust contains atoms, but that will have to be explained later, when I tell how plasma makes its own dust of itself. Plasma is essentially made up of two subatomic particles: electrons that have a negative charge, and protons that have a positive charge and ions ('incomplete atoms'), which also have a positive charge. In whole atoms there is a balance between the negative and positive charges. 'Physical matter' is really atomic matter, because in order to be 'physical' it has to be made of whole atoms.

However, an atom can be turned into an ion by the simple means of stripping it of one of its electrons. It is important to realize that ions are not considered to be physical matter and that they are charged.<sup>2</sup> And to give some idea of the relative sizes, it is usual for a charged dust particle to have 10,000 electrons sticking to its surface. Because protons are larger than electrons, they do not stick to dust particles in quite so high numbers

Contrary to what we might assume, living as we do in a material world, particles only very rarely come together to form whole atoms, and non-atomic plasma is the main constituent of the Universe – more than 99 per cent of it. As I say, we will see shortly why scientists think this, but the important point here is that from this perspective atomic matter is exceptional, and hard, rocky planets are very rare indeed.

It is because there is more plasma than there is atomic matter that I view ions, protons, and electrons as primary, and whole atoms as secondary. This way of looking at things will, I hope, become clearer as we go along

We will see later that our Sun spews out huge quantities of positively charged protons and ions and fills the whole solar system with them. So our entire solar system, including the Kordylewski Clouds, is constantly being inundated with a never-ending flood of ions and protons.

Since space is full of furiously racing and whizzing particles, of both negative and positive charge, it is not possible for a dust cloud to exist

without each single dust particle within it being massively bombarded with thousands of subatomic particles (which as we have seen are much, much smaller than the dust particles) and thus becoming charged itself. It is well known by all scientists working in this field that the surfaces of dust particles (or 'grains') are continuously being charged by a relentless rain of thousands of electrons and positive ions striking them. When those are equal in number and the positive and negative charges balance out, the dust particle is said to have a 'net zero charge'.

However, this is a rare event, and even when it occurs it is likely to be transient and exist for only a few instants. In our own solar system the Kordylewski Clouds are exposed to this relentless and never-ending hurricane of positive charge coming from the Sun in the form of the solar wind. The Sun also emits some filaments or streams of negatively charged electrons as well, but they are far less important components of the solar wind than the positively charged ions and protons. There are such things as negatively charged ions, and they can exist within a plasma, but they are not important for our discussions in this book, and we will not refer to them again.

One might well ask, if there are sustained streams of positively charged particles being emitted by the Sun, why does the phenomenon not have a name in the way that streams of negatively charged particles (known as electrons) are called electricity? It was Peter Mitchell (1920–1992), a very dear friend of mine, who took steps to fill this gap in our language, naming such flows of positive currents proticity. Peter won the Nobel Prize for Chemistry in 1978. He even built a mechanical motor that operated on proticity! He called it a protic motor, and he built it to show that proticity could be a source of energy to drive a motor sitting in front of you in the same way as electricity can do.

So I shall use the word proticity from time to time to describe the flows of positively charged currents, even though the word is still used only rarely by others. Because Peter worked in a highly specialized and closed branch of bio-energetics, not enough people ever knew of his terminological innovation for it to spread to the wider public. Peter is so little known to the general public that his obituary (which I wrote) is included here as Appendix 2. (My efforts to locate Peter's protic motor in recent years have

drawn a blank, alas. I just hope it is still preserved somewhere, though if so, it is possible that no one knows what it is.)

Because the Kordylewski Clouds and others like them are bombarded from without by charged particles, the particles inside them and the dust interact with great intensity and complexity, evolving, as we shall see later, highly complex patterns. Such a large charged dust cloud in space is known as a 'dusty complex plasma'.

One of the things which distinguishes such an entity is that all the processes inside it cannot be described by physicists using simple linear equations. Everything taking place inside this kind of plasma operates in a manner described by non-linear equations.

When something is linear, it means there is a direct and identifiable connection between cause and effect, so that one can predict behaviour. But when linearity breaks down, everything becomes unpredictable and immensely complex.

It is important to bear non-linearity in mind, because it is a feature of quantum mechanical super computers now in development, and analogy with these will play a part in arguments later in the book to show that these clouds may be highly intelligent.

Quantum computers break their information down into a different kind of bit, now called 'qubits'. (The 'qu' stands for 'quantum' ) Because quantum theory is a bit weird, a qubit can have the values of 0 and 1 at the same time. Very much like 'having our cake and eating it'. Some say that qubits can even have any value between 0 and 1.

Meanwhile, the more restless and thrusting of the computer developers look upon qubits as being 'so yesterday'. They now say the future lies not with qubits but with 'qudits'. A qudit can have ten or more values at once.<sup>3</sup> This is like having ten cakes and eating them.

One might say that the work being done today on quantum computers is an attempt to construct computing devices that can do 'non-linear reasoning'. Direct causation is linear. But some circumstances allow all sorts of unpredictable outcomes and unexpected influences. Direct causes that might take place in an ideal world get interrupted and blocked, and things come at you from the left and the right and they change things. This,



as we will see later, is the inescapable and fundamental non-linearity of dusty complex plasmas.

One useful definition of dusty complex plasma in a single sentence is by physicist Osamu Ishihara:

Complex plasma, also known as a dusty plasma, is a plasma with micron-sized (a micron is a millionth of a metre) dust particles in which charged dust particles interact with a background plasma <sup>4</sup>

This definition dates from 2008, and things have moved on since then, and the people working in the field now just say ‘dusty complex plasma’. Also, it is no longer necessarily seen to be the case that the charged dust particles and the ‘background plasma’ should be viewed as separate things that ‘interact’. It is probably more accurate to view the dusty complex plasma as a unified entity, which happens to contain not only those two components or states, but many more besides. I will be elaborating on this last point as we move along in the discussion. And it is also not the case that the dust particles must be micron-sized. They can be much smaller than that, namely nano-sized (one billionth of a metre).

It is surprising how many scientists, including distinguished professors and experts, still do not understand what is a dusty complex plasma. Science has fragmented so much that they do not even know what the people down the hall in the next lab are doing.

There are some developments that tend to make research into plasma better known. Very fine plasmas are used to deposit circuits onto micro-chips, so there are large numbers of people working for the huge corporations making these semiconductor chips. And one of their greatest concerns is the various types of plasma. Indeed, there are huge profits to be made by getting a new and useful angle on this subject. Many new developments are therefore understandably subject to close corporate secrecy. In addition to these corporate considerations, the military and security people are hard at work on plasma, and they do not shout from the rooftops either.

The number of advanced plasma scientists who do openly publish new findings, and are free to do so, is very small. When one of them dies, such as Padma Kant Shukla (1950–2013), all of his colleagues in the field feel as if a whole wing of a mansion has been closed down, such was the vastness

of his knowledge, and such is the sense of loss of both himself and of his wisdom and experience.

We will see later that heroic free thinkers and researchers have suffered from the attempts of the Nazis, the Soviet military and security complex, the CIA and others to control their work

## *A Brief History of Plasma Research*

If plasma research is little known even in many academic and scientific circles, it is pretty much unknown to general readers. In fact, many of the greatest and most brilliant scientists of the age have been involved in researching the area, including several Nobel Prize winners. I am proud to have counted some of them as my good friends, to have corresponded with them and discussed their ideas.

This book includes a historical view of plasma research. I have written it partly because its implications for our understanding of extraterrestrial intelligence and indeed our own intelligence are astonishing.

I will start with a brief account of how the terminology of plasma evolved, and this chapter will also introduce some of the eccentric personalities, mind-blowing ideas and amazing discoveries that feature later in the book.

In 1879, Sir William Crookes (1832–1919), an English scientist, discovered in his laboratory in London something strange, which he called ‘the fourth state of matter’.

Crookes was a chemist as well as a physicist; he discovered the element thallium, for which he is also famous. In 1895, he identified the first known sample of helium. But it was the discovery by Crookes of what he called ‘radiant matter’, which we now call plasma, that changed the whole of physics and chemistry. He had been studying cathode rays, which are rays of electrons. He established that they travelled in straight lines, that they could cause fluorescence, and generate heat in a Crookes tube [the vacuum tube, or valve, which was first invented by him]. He had opened the door and let in subatomic particles.<sup>1</sup>

I have Crookes's first published report of it in front of me as I write, since I own an original copy of the *Proceedings of the Royal Society of London* for 1879–80, which contains it. It is on page 469, and it is entitled 'On a Fourth State of Matter'. Perhaps it is worth my quoting one of Crookes's astounding concluding remarks in that paper, which I believe has never been reprinted until now:

These considerations lead to another and curious speculation. The [general view is that the] molecule—intangible, invisible, and hard to be conceived—is the only true matter, and that which we call matter is nothing more than the effect upon our senses of the movements of molecules, or, as John Stuart Mill expresses it, 'a permanent possibility of sensation' [But in Crookes's view] the space covered by the motion of molecules has no more right to be called matter than the air traversed by a rifle bullet can be called lead. From this point of view, then, matter is but a mode of motion, at the absolute zero of temperature the inter-molecular movement would stop.

This statement of 1879 certainly gives us something to think about at the subatomic level, and it can readily be seen also that Crookes was anticipating the phenomena later to be known as superconductivity ([here](#)) and superfluidity ([here](#)), phenomena we will return to when we come to consider quantum mechanical qualities in plasma that may help give rise to intelligence.

The great genius Nikola Tesla (1856–1943), who invented alternating current and thus likewise played a huge part in bringing about the existence of the modern world through making it possible for everyone to have electricity, describes frankly in his autobiography that he only decided to study electricity and commence his electrical inventions, such as the Tesla Coil, because of inspiration from Crookes.

In his 1919 account of his life, Tesla wrote:

Two or three months before I was in London in company with my late friend, Sir William Crookes, when spiritualism was discussed, and I was under the full sway of these thoughts. I might not have paid attention to other men, but was susceptible to his arguments as it was *his epochal work on radiant matter* [my italics], which I had read as a student, that made me embrace the electrical career<sup>2</sup>

Later in life, Crookes became so interested in the possible existence of a 'spirit world' that he attempted to apply scientific techniques to psychical research. He became something of a hero to the general public of Victorian and Edwardian England for his boldness in that, but many scientific

colleagues pulled their longest faces and accused him of losing his senses and betraying science. However, as we shall see in Chapter 6 when we consider plasma and matters spiritual, Crookes's intuition may have been well ahead of his time and may have been amply justified.

Today we call matter in this fourth state 'plasma', the name given to it by the American scientist Irving Langmuir (1881–1957), who would win the Nobel Prize for Chemistry in 1932.

He coined the word because the way a charged gas carries electrons and ions reminded him of the way blood carries red and white corpuscles, so the plasma seemed to him to be 'alive'. His historic introduction of 'plasma' as a new word in physical science appeared in print for the very first time together with the word 'sheaths' for the 'skins' of plasmas in an article entitled 'Oscillations in Ionized Gases', which was published in August of 1928 in a scientific journal, where he wrote these memorable words:

The word 'plasma' will be used to designate that portion of an arc-type discharge in which the densities of ions and electrons are high but substantially equal. It embraces the whole space not occupied by 'sheaths'.<sup>3</sup>

It was then that the science of plasma physics was truly born; all the work that had been done since 1879 on what had been called 'ionized gases' or 'radiant matter' became known retrospectively as plasma research.

- 1941: Lyman Spitzer (1914–1997) suggested that interstellar dust particles might be acquiring charge from electrons in the form of 'ionized gas' (Spitzer's preferred name for plasma, 'ionized gas' was, as we have just seen, later abandoned). We now know that all interstellar dust is probably charged. But in 1941, this was an astonishing new idea.
- 1954: the Swedish scientist Hannes Alfvén (1908–1995) suggested that planets and comets in our solar system might have been formed as the result of the coagulation of dust particles in the solar nebula that had been charged by plasma. He won the Nobel Prize for Physics in 1970.
- 1955: Winston Harper Bostick (1916–1991) created the first artificial plasmoid (blob of plasma) in his laboratory.

- 1955: Peter [Pytor] Leonidovich Kapitsa (1894–1984) suggested that ball lightning was really a spherical plasmoid, a type of plasma. Between 1930 and 1934 he was the first Director of the Mond Laboratory at Cambridge.
- 1958: Eugene Newman Parker proposed the existence of a 'solar wind'. This proposal was first made by Peter A. Sturrock, with whom I carried on a correspondence on other subjects many years ago, and James Hartle. We now know the solar wind to be two different kinds of plasma wind emanating from the Sun. One is called 'the slow solar wind', which travels at speeds below 450 km s<sup>-1</sup> and the other is called 'the fast solar wind', which travels at speeds of between 700 and 800 km s<sup>-1</sup>. But because the Sun is rotating clockwise, the beams do not go straight, they swirl with the rotation and form an Archimedean spiral shape in space, and hence swish across us rather than blasting straight at us, as illustrated in Figure 2.

Inherent in them is a powerful magnetic field. The Ulysses spacecraft, launched towards the Sun in 1990, detected and thus confirmed the existence of these separate solar wind components in 1994/5. The space between the Earth and the Sun is completely filled with solar wind plasma. But prior to 1958, the 'establishment scientific opinion' said that 'outer space is empty' and was composed solely of vacuum.

- 1958: the Van Allen Radiation Belts – two doughnut-shaped belts made of plasma surrounding the Earth – were discovered, which we now know to be made of plasma: these will be considered in Chapter 4, ([here](#)).

Also in 1958, the United States exploded a ten megaton atomic bomb in the high atmosphere (at 75 kilometres, or 46.6 miles) in order to produce an artificial aurora and study the plasma regions above the planet. (The follow-up studies were still going on a year later, so lasting was the damage to the high atmosphere.) Many more such atomic blasts followed. It is now believed that all of these atomic explosions, apparently about one hundred of them, and other crazily ill-advised military 'tinkering' with the high atmosphere by

both sides in the Cold War, contributed to the instabilities of worldwide climate that we see today.

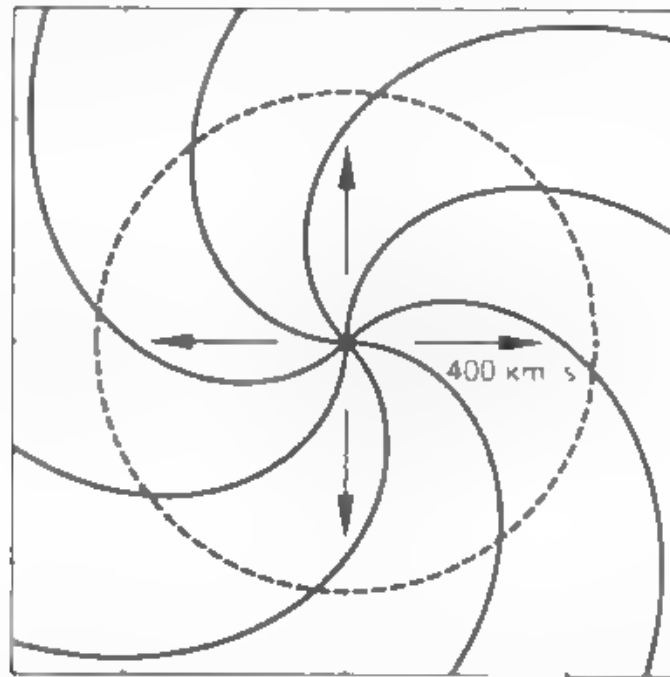


Figure 2 The central dark spot is the Sun. The dotted line is the orbit of the Earth, intentionally simplified here to look like a circle. The solar wind is not blasting straight at us, but is swirling in this way, with the swirls sweeping across us. This drawing is taken from Alexander Piel's excellent book *Plasma Physics* (2nd edition, Springer Verlag, Heidelberg, 2010). He does not give his source for it, and the speed has been indicated wrongly by the unknown artist, nor is the rotation taken into account for the speed indication. But the basic idea is clear, namely the Archimedean spiral form of the solar wind which fills our solar system.

- 1959: my friend Thomas Gold (1920–2004) coined the term 'magnetosphere' to describe a tear-shaped region of magnetized plasma surrounding the planet, which protects it from harmful aspects of the Sun's solar winds. Tommy also conducted important research on the Universe's continuous creation of matter, an important area of study that is very relevant to complex dusty plasmas, as we will see later.
- 1960: Theodore G. Northrop and Edward Teller (1908–2003) provided the theoretical explanation for the existence of the Van Allen Belts.

- 1961: in the Soviet Union David Albertovich Frank-Kamenetsky (aka Frank-Kamenetskii, but also mistakenly aka Kamenezki or Kamientsky) (1910–1970), suggested in an article for a technical journal that plasma may exist within living organisms<sup>4</sup> He thus anticipated much of the subject of the latter part of this book.
- 1962: Chandra Wickramasinghe, while still a PhD student of Sir Fred Hoyle (1915–2001) at Cambridge University, proposed that the dust known to exist in interstellar and inter-galactic space, until then thought to be ice grains, was really made of carbon. This entirely revolutionary idea – important to this book, because as we have seen, complex dusty plasmas contain such dust – was accepted by the astronomical community five years later.
- 1963: David Pines laid the foundations for quantum plasma physics and collective behaviour in ‘solid-state plasmas’ by his studies of ‘the properties of electron plasma oscillations in high-density low-temperature quantum plasmas’, in other words, the wobbles that happen in plasmas at extremely low temperatures. This may sound very obscure and technical, but we will see later that it was fundamental to the advance of plasma physics, including with regard to plasma’s capacity for bringing some of the weirder quantum phenomena into the macro world.

At the same time, my friend Peter Mitchell (1920–1992) published his full ‘chemiosmotic theory’ explaining that the energy functions of biological systems are based upon subatomic currents. This explanation came to be known as ‘vectorial metabolism’, because it describes the directions in space of energy usage within the body. In 1972, Peter introduced the term proticity, as already mentioned. He was awarded the Nobel Prize for Chemistry in 1978.

- 1982: Jay Hill and Devamitta Asoka Mendis suggested that the ‘spokes’ (so called by astronomers because they resemble the spokes of a wheel) found in the rings of Saturn the previous year by Voyager 2 consist of dust that has been charged in a plasma.



- 1986: Hiroyuki Ikezi predicted that plasma could exist as crystals. He called them 'Coulomb Crystals', named after Charles-Augustin de Coulomb (1736–1806), a pioneer of studies of electricity. He said these crystals could be formed by dust particles in a plasma. This is one of the key discoveries concerning the subject of this book, because crystals can play a vital role in storing information in ways necessary for the evolution of intelligence and for communication. As we will see later, it would be seven years before Ikezi's prediction was proved to be correct.
- 1989: Gary S. Selwyn and his team at IBM published his discovery that plasma actually manufactured dust, and that the dust found inside fusion reactors and other sources was not dirt or contamination, as had been assumed, but was created by the plasma itself.<sup>5</sup> In his dramatic experimental discovery, Selwyn was able to show by laser light scattering that, starting from single molecules, dust grew naturally from nanometre sizes up to micrometre sizes within the plasma.

This changed the whole of the science of plasma research. Until then plasma dust had been viewed as 'dirt', and how to avoid the 'contamination' by the dust or dirt was the focus of research attention. But once it had been demonstrated by Selwyn that plasma made its own dust, everything changed, and it was at this point that it became possible to envisage what we now call dusty complex plasma as a unique and very special type of plasma.

- 1993: Hubertus M. Thomas and Gregor Eugen Morfill announced at a plasma conference that they had discovered that the plasma crystals predicted in 1986 by Ikezi do really exist. In 1994 they published their research. At about the same time two other teams published papers making the same claim, one by Jiun-Haw Chu and Lin I, and the other by Yasuki Hayashi and K. Tachibana. As I will explain later on, dusty complex plasmas tend to contain plasma crystals, but it was only in 1993 that it became possible for scientists to make this assumption with confidence, to begin searching for them in earnest, and to include the crystals in their models of the complex interior structures of the plasmas.

- 1997: Jesper Schou, Philip Scherrer, and their team at Stanford University discovered gigantic plasma rivers flowing beneath the photosphere (commonly called the 'surface') of the Sun. A NASA press release from the Goddard Space Flight Center at Greenbelt, Maryland (Release 97-184, dated 28 August 1997) announced the discovery of "jet streams" or "rivers" of hot, electrically charged gas called plasma flowing beneath the surface of the Sun' The press release quoted Jesper Schou: 'Moreover, in what is a completely new discovery, we have found a jet-like flow near the poles. This flow is totally inside the Sun. It is completely unexpected, and cannot be seen at the surface.'

Schou's colleague Philip Scherrer was quoted as saying:

These polar streams are on a small scale, compared to the whole Sun, but they are still immense compared to atmospheric jet streams on the Earth. Ringing the Sun at about 75 degrees latitude, they consist of flattened oval regions about 17,000 miles across where material moves about 10 per cent (about 80 mph) faster than its surroundings. Although these are the smallest structures yet observed inside the Sun, each is still large enough to engulf two Earths.

Schou and Scherrer also discovered that these rivers of plasma extend at least 12,000 miles below the Sun's 'surface' (i.e., the photosphere). Even more extraordinary, Schou and another colleague, Alexander G. Kosovichev (known as 'Sasha'), also discovered six additional plasma belts flowing beneath the 'surface', each of which is more than 40,000 miles across. If you add the widths of these flowing plasma regions together, they come to 257,000 miles total width of flowing plasma streams beneath the Sun's 'surface'. Just to put this number in perspective, it is greater than the average distance of the Earth from the Moon, which is 238,855 miles. (The orbit is not a perfect circle, hence the 'average'.) This discovery showed that dusty complex plasmas can contain fantastically intricate internal structures consisting of gaseous, liquid, and solid crystal plasma components, and that the crystals can liquefy and the liquids can crystallize.

Dust and dusty plasmas are ubiquitous in nature, occurring in interplanetary and interstellar clouds, dust rings around planets like Saturn, on the surface of the moon, noctilucent clouds [night-shining

clouds] in the mesosphere [the third layer of the atmosphere, just above the stratosphere], or thunder clouds.<sup>6</sup>

The ways in which charged dust forms ‘self-organized systems’ in plasma is key to this book. But because dust can be so varied, we might well ask if we need special kinds of dust in order to have self-organization take place, or will any old dust do? On this point there has been a surprising recent discovery, announced on 28 November 2019 in *Nature*. It was a news story about a paper just published in *Physical Review Letters*, whereby some scientists at Northwestern University in America had shown that ‘tiny plastic beads wandering aimlessly through water can spontaneously form organized swarms and clusters – just like swimming bacteria.’ The polystyrene spheres ‘artificially replicate bacterial swarming’.

This was accomplished by putting the microspheres in oil and subjecting them to pulses from an electric field. As a result of this, the spheres became electrically charged and began ‘to suddenly spin and propel themselves through the fluid’. By altering the pulses, the spheres were made to cluster together into large clumps. After this, by shortening the pulses, the result was ‘the formation of one continuous, roiling swarm of beads’, which resembled the swarming of bacteria.<sup>7</sup>

When confronted by this kind of behaviour in inanimate particles, simply as a result of the influence of electrical fields, one realizes that what seems to be ‘informed behaviour’ or ‘self-directed behaviour’ can manifest without life in the conventional sense even being present, much less in charge. This is a rather sobering realization. If the same behaviour exhibited by bacteria can also be seen in inanimate plastic spheres, then what does this really mean? At a fundamental level, we see here with the lifelike behaviour of inanimate particles so precisely mimicking living things that even the very definition of ‘life’ is threatened.

We need to keep uppermost in our minds that the question ‘What is life?’ is not going to go away, and we will need to bring it to bear when we consider the question of whether or not plasmas can be said to be living, intelligent and conscious.

The phenomenon of the patterned clustering of micro-particles is fundamental in dusty complex plasmas. When it happens, the clumps are known either as ‘Coulomb Balls’ (once again, named after the scientist

Coulomb, as with the earlier case), or as Yukawa Balls. The latter are named after Hideki Yukawa (1907–1981), the Japanese Nobel laureate physicist.

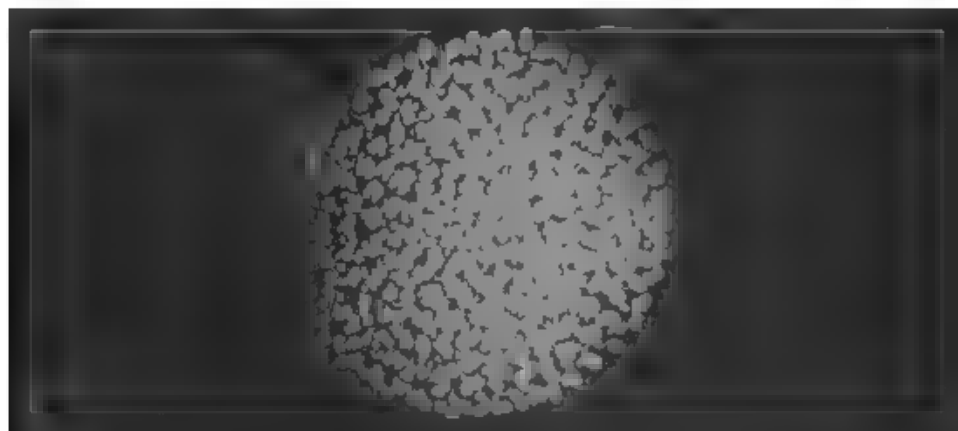


Figure 3 A Yukawa Ball, which consists of several hundred dust particles clustered together. The ball, which is a ‘strongly coupled’ (a term for describing elements of a system, such as particles, which have powerful interaction energies holding them together) dusty complex plasma structure, is approximately 7 mm across. The spherical cluster has a nested shell structure and is not just random inside. These balls are self-assembled. Such Yukawa Balls can form even at room temperature and do not need to have an exotic environment of very high or very low temperatures.

From Torben Ott, et al., ‘Molecular Dynamics Simulation of Strongly Correlated Dusty Plasmas’, 2010.<sup>8</sup>

Turning back to the question of where the dust comes from, in addition to the discovery that plasma manufactures its own dust, in 2017 Hamish Gordon and his collaborators revealed that the atmosphere also manufactures its own ‘new particles’ spontaneously from gas within the air itself. The new particles are nano-sized and they form in clouds in the Earth’s atmosphere from condensable vapours.<sup>9</sup>

The authors of this report in the *Journal of Geophysical Research* state: ‘New Particle formation has been estimated to produce around half of cloud-forming particles in the present-day atmosphere.’ They define new particle formation as ‘the process by which gas molecules collide and stick together to form atmospheric aerosol particles [particles floating in the air]. Aerosols act as seeds for cloud droplets ...’

A paper later in the same year by Robert Wagner and his collaborators, which included Gordon, reported further: ‘The formation of secondary

particles in the atmosphere accounts for more than half of global cloud condensation nuclei.'

They went on to say that their experiments at CERN revealed that the formation of these particles was aided by ions in a positively charged plasma:

Our results indicate that ions enhance the nucleation process [the formation of nuclei around which particles can grow] when the charge is necessary to stabilize newly formed clusters <sup>10</sup>

In the autumn of 2018, a further paper appeared on this subject by Dominik Stolzenburg, Paul M Winkler and their collaborators.<sup>11</sup> They said:

Nucleation and growth of aerosol particles from atmospheric vapors constitutes a major source of global cloud nuclei

And further work on this subject was published in *Nature* in October of 2019, when Christina J. Williamson and her collaborators reported crucial new findings about the subject.<sup>12</sup> This team of researchers has discovered that new particle formation in the atmosphere 'persists at all longitudes as a global-scale band in the tropical upper troposphere, covering about 40 per cent of Earth's surface ' They say that global climate models do not take account of this and the existing climate models 'underestimate both the magnitude of tropical tropospheric NPF [new particle formation] and the subsequent growth of new particles to CCN [cloud condensation nuclei] sizes ' Accordingly, all public climate change discussions at the moment are deeply flawed because they rely upon inaccurate models.

This team says: 'New particles form in the atmosphere when condensing gases form stable clusters with diameters of more than 15 nm [nanometres] or so.' They then say that these particles are too small for detection by satellites, which are unable to detect particles smaller than 100 nm. That is why this important phenomenon has been missed, because it is so difficult to detect by our existing technology As a result of these new findings, NASA has recently set up a programme to try to obtain more detailed information about these new particles in the atmosphere, so that we can know how they affect our climate models and, of course, our climate itself

The formation of these tiny particles out of 'nothing' in our atmosphere is very similar to the formation of tiny particles out of 'nothing' in plasma,

as both are a result of clustering processes within the two separate media of plasma and air. And both processes are quite recent discoveries: the plasma processes have been known for several years now, though not widely so, and as we have just seen, the atmospheric processes are an even newer revelation. The similarities of ‘appearing to get something out of nothing’ in both plasma and in air suggests that a universal process is being manifested in the two different cases.

And considering that, it is perhaps not surprising there is also another way of getting ‘something out of nothing’, which has been known since the 1990s, and it operates at an even more fundamental level. I am referring to the creation of a type of subatomic particle known as a baryon.<sup>13</sup>

Experiments have verified that the creation of baryon particles can occur when whirling vortices are created in a fluid medium such as Helium 3 ( $^3\text{He}$ ), a form of helium with the quality of ‘superfluidity’. This phenomenon is an important part of some of the weird quantum effects associated with plasmas, as we shall see shortly, and it arises where liquids can flow without resistance. A key article revealing a particularly important finding about this was published in *Nature* in 1997, and I have kept that issue of the magazine folded over to that article to remind me ever since its publication in the spring of that year.

It was the group led by T.D.C. Bevan who published this key article about what they called ‘baryogenesis’ (baryon creation).<sup>14</sup> Bevan went on to publish much more about this type of thing over the succeeding years, but this particular article was the first time that the creation of baryons by this method had been demonstrated in a laboratory:

Here we describe experiments on  $^3\text{He}$  that demonstrate the creation of excitation momentum (which we call momentogenesis) by quantized vortices (flows around an axis at a quantum level of smallness) in the superfluid — our results provide quantitative support for this type of baryogenesis [creation of baryons]

I cannot take space to explain this fully or do justice to the details, especially as it involves discussing quarks, chirality, ‘spectral flow’, and all kinds of things of that sort which are not necessary in this book, but may be found by consulting the many papers of Bevan and his teams directly.

The main thing to come out of all this is the demonstration that those nuclear particles known as baryons have been created in the laboratory, and

that they are also being created in a similar manner throughout space in superfluids, such as those to be found – as we shall discuss later – in dusty complex plasmas.

So we see clearly and repeatedly that it does not take something to create something, as it can just as readily be created by nothing

So what is existence, if it can suddenly appear like that?

The plasma physicist who has done the most to call attention to the creation of matter within dusty complex plasma clouds is without question the Russian scientist Vadim Nikolaevich Tsytovich (born 17 March 1929 in St Petersburg, then called Leningrad, died 2015). For many years he published articles and books reporting on advanced findings from dusty complex plasma research showing that something which looks very like life can be produced in charged dust clouds.

In one article in 2007 he stated clearly:

It is concluded that complex self-organized plasma structures exhibit all the necessary properties to qualify them as candidates for inorganic living matter that may exist in space, provided certain conditions allow them to evolve naturally.<sup>15</sup>

Tsytoich and three colleagues including Sadruddin Benkadda were very specific about the self-organization within dusty plasmas of life-like phenomena, especially in an article that they published in 2000 and which I shall quote in a moment. But one technical word – dissipative – needs to be explained first. It does not refer to the common use of the word ‘dissipation’ to describe overindulgence in sensual pleasures. ‘Dissipative’ in this sense was first introduced into science in 1972 by the Belgian mathematical theorist Jan Camiel Willems (1939–2013), and became widespread because of its adoption and development by Ilya Romanovich Prigogine (1917–2003), the Nobel Laureate for Chemistry in 1977.

Prigogine entirely revolutionized the science of thermodynamics, which is essentially the study of the actions of heat and all that follows from them. Until Prigogine, it was widely believed that the Universe was steadily running down, that things slow down and fall apart, as the Second Law of Thermodynamics says they will.

What Prigogine discovered and proved was that energy brought into a chemical system, instead of always contributing by a process known as the increase of entropy (‘the progressive increase of disorder’), could be

dissipated away into other directions and purposes that were productive and could form open, interactive structures such as life forms, known technically as ‘dissipative structures’. These structures, being like isolated islands of positivity in a sea of increasing entropy and hopelessness, could instead become increasingly complex and self-organizing systems

Prigogine built upon these discoveries his concepts of self-organization, which are now at the heart of what we are finding in dusty complex plasmas. So what Prigogine did was no less than explain the central role of life in the Universe. Although this was by no means heard by everyone, it was the philosophical death knell for the mechanical Universe.

And so we return to Tsytovich and his colleagues, and to plasma. Here are further comments made by Tsytovich and three colleagues in 2000:

Self-organization processes in dusty plasma are expected to be very important since the latter is an open system with a high rate of dissipation – a high rate of dissipation provides rapid development of self-organization processes and formation of long-lived dissipative structures. Dusty plasma is an open system where the rate of dissipation is high and there is a tendency to self-organization. New types of nonlinear interactions are possible in dusty plasmas.<sup>16</sup>

The importance of dusty plasmas being ‘open systems’ is that they can absorb energy from outside, which then fires the growth of complexity. The Kordylewski Clouds undoubtedly ‘feed’ on energy from the Sun in this way.

The next year, in 2001, Tsytovich published a paper ‘Evolution of Voids in Dusty Plasmas’ on the important subject of voids, or empty spaces, inside dusty complex plasmas. ‘It is shown that formation of dust voids is a general phenomenon in dusty plasmas.’<sup>17</sup> Voids are of immense importance in general, though rarely recognized. He went on to explain that whereas both dust structures and dust voids are formed in some plasmas, this cannot happen in a purely homogenous dusty plasma. There can be no internal architecture if the dust structures are not separated from one another by voids. A structure must be separated from the rest of the mass by a space, for otherwise it is no longer a distinct structure.

It is surprising how rarely people think of this. The human body is full of voids, and if it were not, you could not differentiate the kidney from the liver or the stomach from the lungs. Technically, these voids within our bodies are known as body cavities. And if the Kordylewski Clouds are to



have the complex internal structure that we know dusty complex plasmas to have, then they too must contain voids, or cavities.

In 2004, Tsytovich and his friend Gregor Eugen Morfill (another of the world's most distinguished plasma scientists) published a paper making clear that it is the non-linear character of the dusty complex plasmas which makes the self-organization of the internal structures possible:

Dusty plasmas are unusual states of matter where the interactions between the dust grains can be collective and are not a sum of all pair particle interactions. This state of matter is appropriate to form non-linear dissipative collective self-organized structures.<sup>18</sup>

They pointed out that such findings were compatible 'with recent results of structure observation in the experiments on the Inter-national Space Station.' There were numerous plasma experiments carried out on the Space Station, because scientists were eager to see how plasmas behave in a gravity-free environment. Many results have come from this work.

In 2014, a major paper was published by Tsytovich with Alexey Ivlev, Andreas Burkert, and his old friend and colleague Morfill. It was a long and important review article entitled 'Compact Dusty Clouds in a Cosmic Environment'.<sup>19</sup>

In this paper, Tsytovich and his colleagues pointed out that in order to be stable, a dust cloud must self-organize and fill itself with 'clumps' and internal structure. If a dust cloud remains smooth, it will be destroyed. They also said that such stable clouds can be as small as one-thousandth the size of the Earth and still cohere. So we have their assurance, therefore, that the Kordylewski Clouds must contain internal structure and be self-organized in order to have survived. And they further add that this is all possible while remaining 'optically thin', in other words, being invisible.

The authors also say that within dusty plasmas dust can confine itself into stable spherical clusters:

Spherical dusty clouds can be formed – suggesting that this process of dust self-organization might be a generic phenomenon occurring in different astrophysical media. We argue that compact dusty clouds can represent condensation seeds [in other words they can provide the necessary conditions] for a population of small-scale, cold, gaseous clumps in the diffuse interstellar medium. They could play an important role in regulating its small-scale structure and its thermodynamic evolution. Self-organization of dusty (complex) plasmas has been observed in numerous experiments. Different types of structures formed in dusty plasmas under microgravity conditions (in experiments performed on the International Space Station) as well

as on the ground include compact clusters, voids surrounded by dust shells, vortices, etc. We predict that this process can occur in a broad range of plasma parameters, which indicates that such self-organization might be a generic phenomenon operating in different astrophysical media

The giant spherical cosmic clouds discussed by Tsytovich and his colleagues, having between ten and a hundred times the distance of the Earth to the Sun as their diameters, are much bigger than our Kordylewski Clouds. And the giant ones he is discussing are also seen as forming in interstellar space between the stars, in a far thinner medium, whereas the smaller Kordylewski Clouds are in our own solar system, with a much denser medium, and with the constant feeding of energy into them by the solar wind.

Sergey Vladimirov, another of the most famous plasma scientists, has written:

The dust-plasma system is an open system. Strong interactions of dust particles and the openness of the system lead to self-organization and 'structurization' of initially homogeneous dust clouds into a complex aggregate of dissipative dust structures. These structures become quasi-stationary within short time scales [in other words, they very rapidly become almost stationary] ...<sup>20</sup>

In another paper, Tsytovich, Morfill and four other colleagues stressed how plasma crystals inside the dusty complex plasmas could spontaneously form helical structures resembling DNA:

Complex plasmas may naturally self-organize themselves into stable interacting helical structures that exhibit features normally attributed to organic living matter. The self-organization is based on physical mechanisms of plasma interactions. As a result, each helical string composed of solid microparticles [dust] is topologically and dynamically controlled by plasma fluxes leading to particle charging. These interacting complex structures exhibit thermodynamic and evolutionary features thought to be peculiar only to living matter. We examine the salient features of this new complex 'state of soft matter' in light of the autonomy, evolution, progeny and autopoiesis [autopoiesis refers to a system capable of reproducing and maintaining itself] principles used to define life. It is concluded that complex organized plasma structures exhibit all the necessary properties to qualify them as candidates for inorganic living matter that may exist in space provided certain conditions allow them to evolve naturally.<sup>21</sup>

This outspoken declaration could almost constitute a manifesto for the Kordylewski Clouds (though it was published twelve years before their existence was confirmed). Of course helical structures in humans have functions of storing and communicating information, so the crucial question

raised here is: could helical structures in plasma have the same function? And could these be the seeds of an alternative, evolving form of life?

The authors go on to say:

Memory and reproduction are necessary for a self-organizing dissipative structure to form a 'living material'. The well-known problem in explaining the origin of life is that the complexity of living creatures is so high that the time necessary to form the simplest organic living structure is 'seems' too large compared to the age of the Earth. Can faster evolution rates be achieved for non-organic structures, in particular, in space consisting mostly of plasmas and dust grains, i.e., of natural components spread almost everywhere in the Universe? If yes, then the question to address is: are the above necessary requirements of self-organization into a kind of 'living creature' present in plasmas containing macro-particles such as dust grains?

Here, we discuss new aspects of the physics of dust self-organization that can proceed very fast and present an explanation of the grain condensation into highly organized structures first observed as plasma crystal. Our analysis shows that if helical dust structures are formed in space, they can have bifurcations [instances of splitting] as memory marks and duplicate each other, and they would reveal a faster evolution rate by competing for 'food' (surrounding plasma fluxes). These structures can have all necessary features to form 'inorganic life'.

This should be taken into account for formulation of a new SETI-like program based not only on astrophysical observations but also on planned new laboratory experiments, including those on the ISS [International Space Station]. In the case of the success of such a program, one should be faced with the possibility of resolving the low rate of evolution of organic life by investigating the possibility that inorganic life 'invents' the organic life.

The passage specifically says that helical dust structures can replicate, in other words, like helical DNA molecules, inside dust clouds. Inorganic living entities are then formed that 'compete for food' in the form of sources of incoming plasma, which they eat. (As we have seen, in the case of the Kordylewski Clouds, most of their 'food' consists of the solar wind coming from the Sun.) All of this happens at a far faster rate of evolution than is the case with organic life, and in its development would outpace organic evolution by billions of years, hence clearly gaining dominance.

From this point of view, we as organic humans are rather primitive latecomers to a fantastically ancient tradition of inorganic life forms. And as they say, 'a new SETI-like program' should be started. SETI, as many readers know, stands for Search for Extraterrestrial Intelligence. After all, who needs little green men when you've got gigantic intelligent clouds on your doorstep, which are billions of times more intelligent than any little green man could ever be, billions of years older than any possible organic life form, and the entities who must in effect be the true Masters of the Universe?

Throughout this book we will be looking at research from around the world, particularly America, which complements and reinforces the work of Vadim Nikolaevich Tsytovich and his colleagues.

With ‘dust’ made by the plasma itself replacing ‘atoms’ as the building blocks, living bodies can be formed. We might consider the charged dust to be ‘dust atoms’, or perhaps more accurately, ‘dust molecules’. And from them, charged plasma entities can emerge by the process called self-organization. That means that no outside source needs to create them, as they can create themselves.

By this means, plasma people can exist, who are imperceptible to the optical nerves of the ‘physical people’ who are made not of plasma but of flesh and blood. Because we are incapable of directly perceiving the plasma people, we do not know they are there. And furthermore, they may be of such diffuse matter that they can pass through our dense physical matter and emerge intact. Scientists know that ball lightning does this, as we will discuss in Chapter 4. Spiritual beings such as angels are also said to have this capability, which we will come to in Chapter 6.

If what these scientists are showing – and I for one think they are – is that the internal structures of the two clouds could be so complex, and at such a vast scale, then they surpass any possible human knowledge at this time. The storage capacity for information would easily include the ability to retain full knowledge of everything that has ever happened in our local cosmic environment for four billion years. Everyone who has ever lived will be recorded. Every creature that has ever roamed the surface of the Earth will be recorded. Every plant which has ever grown will be as well. The presiding consciousnesses, or what psychologists call ‘the executive ego states’, of the two clouds will have personalities so alien from our own that we cannot conceive of them. Since the clouds evidently exist as a pair, they may be ‘married’. (Or at least in a civil partnership?)

The questions are only just beginning.

## 4

### *The 99 Per Cent*

*One accepts those incompatible things which, only because they coexist, are  
called the world*  
Jorge Luis Borges

In this chapter, I want to discuss a very surprising assertion that is not at all well known to the general public and perhaps not well known even by scientists who work in other fields, but is universally accepted by scientists who do work in the field of plasma research. Alongside our atomic, visible world is the subtler universe of plasma. It is in our understanding of that 'other kind of matter' that ground-breaking progress has been made recently.

Some will no doubt say there is no 'other kind of matter', and that I must be talking nonsense. But the fact is that the existence of other kinds of matter, several of them, has been now proved. In fact so much has recently become known about them that we can now begin to have some proper understanding of them.

Let us start by talking about the most basic 'other kind of matter', which is called plasma today, and which was first properly 'discovered' as long ago as 1879, though not named until 1928 by Irving Langmuir, as we have seen.

We have already seen, too, that plasma is very different from 'physical matter'. 'Physical matter' is very rare in the Universe. At least 99 per cent, and some say more than 99.99 per cent, of the Universe is composed of plasma. We therefore live in a plasma universe, not a physical matter universe. But what does this mean?

What it means is that everything familiar to us on Earth is abnormal. What we call 'physical matter' exists in three familiar states' solid, liquid, and gaseous. These are, of course, exemplified in the three states of water' ice, liquid water, and steam. And until 1879, those were thought to be 'the three states of matter', beyond which there were no others

Nowadays the fact that the Universe is made of at least 99 per cent plasma is accepted by all astronomers, astrophysicists, cosmologists and the other scientists concerned with those subjects, but the implications of this remain obscure.

And the fact that new kinds of plasma keep being discovered does not make it any easier. The latest forms of plasma are so extraordinary that they are frankly baffling. And the very small community of plasma scientists at work on these problems, some of whom I quoted in the previous chapter, are making an astonishing amount of progress, but are doing so largely without the knowledge of other physicists and astrophysicists.

Here is what some of the leading scientists in the field have to say:

Nearly all the matter in the universe exists in the plasma state, occurring predominantly in this form in the Sun and stars and in interstellar space.

(Anthony L. Peratt, *Physics of the Plasma Universe*, 2nd edition, 2015, p 2.) Peratt was Scientific Advisor to the United States Department of Energy between 1995 and 1999. He was Acting Director of National Security, Nuclear Non-Proliferation Directorate, in 1998. Since 1981 he has been associated with the Los Alamos National Laboratory.

All but an infinitesimal part of the universe appears to be made up of plasma, probably all of it magneto-plasma. Thus in most problems in cosmic electrodynamics we are dealing with a non-rigid and electrically conducting medium extending to infinity – the remainder of the universe is made up of various plasmas. The plasmas with the lowest degrees of ionization are the lower parts of the ionospheres of the Earth and other planets. These regions are really boundary regions between the universal plasma and the small insulating, atmospheric shells.

(John Hobart Piddington, *Cosmic Electrodynamics*, 1969, pp. 24–5). 'Jack' Piddington (1910–1997) was Chief Research Scientist at the National Measurement Laboratory in Sydney, Australia, from 1966 to 1975.

It is likely that 99 per cent of the matter in our universe (in which the dust is one of the omnipresent ingredients) is in the form of a plasma. Thus, in most cases a plasma coexists with the dust particulates. These particulates [matter in the form of minute separate particles] may be

as large as a micron. They are not neutral, but are charged either negatively or positively depending on their surrounding plasma environments. An admixture of such charged dust or macro-particles, electrons, ions, and neutrals forms a 'dust plasma'.

(Padma Kant Shukla and Abdullah al Mamun, *Introduction to Dusty Plasma Physics*, 2002, p. 1) Shukla (1950–2013) was Distinguished Professor and Director of the International Centre for Advanced Studies at Ruhr-University Bochum in Germany. Mamun is Professor of Physics at Jahangirnagar University, Dhaka, Bangladesh.

The three states of matter which occur at the surface of the earth are however not typical of matter in the universe. Most of the ... matter in the universe exists as plasma.

(Marcel Goossens, *An Introduction to Plasma Astrophysics and Magnetohydrodynamics*, 2003, p. 1) Goossens is Professor of Applied Mathematics at the Catholic University of Leuven in Belgium.

Scientific interest in high-energy plasmas has also been rekindled along with pragmatic interest, because the great bulk of matter in the universe is in precisely this exotic state. For about 95 per cent of the mass (neglecting dark matter), according to modern estimates, is the plasma of ordinary and neutron stars, pulsars, black holes, and giant planets of the solar system, as well as the recently discovered hundreds of planets beyond the solar system.

(Vladimir Yevgeyevich Fortov, *Extreme States of Matter on Earth and in the Cosmos*, 2011, p. ix.) Fortov is one of the leading scientists in the world in his field, and is currently President of the Russian Academy of Sciences.

In most of the universe, plasma is actually the 'first' state of matter, and by a very large margin. Out there, fully intact atoms are abnormal in the extreme. Practically all the visible contents of the cosmos – not just stars, but even regions of rarefied interstellar dust containing barely a million particles per cubic metre – are in a plasma state.

(Curt Supplee, *The Plasma Universe*, 2009, p. 1) Supplee is a science writer who has won the Science Journalism Award from the American Association for the Advancement of Science, and other such awards, and has been nominated twice for the Pulitzer Prize. At one time he was Director of the Office of Legislative and Public Affairs at the National Science Foundation in the USA.

Plasma physicists know that ... the universe is not made up of 'invisible matter' but rather of matter in the plasma state ... electric plasma ... fills more than 99 per cent of the universe.

(Donald Edward Scott, *The Electric Sky*, 2012, p. 3 ) ‘Don’ Scott is retired Professor of Electrical Engineering at the University of Massachusetts/Amherst.

Among all objects observed in nature, about 90 per cent exist in ionized form. Plasmas, often considered the fourth state of matter, span a huge diversity of parameter scales and exist throughout the universe.

(Michael Bonitz, et al., *Introduction to Complex Plasmas*, 2010.) Bonitz is Professor and Chair of Statistical Physics at the Institute of Theoretical Physics and Astrophysics at Christian-Albrechts-University at Kiel in Germany.

Under ordinary terrestrial conditions the plasma state of matter is quite rare and unusual. But in the universe, cold solid bodies such as our Earth appear to be a rare exception. Most of the matter in the universe is ionized, i.e., it exists in the plasma state. In our own solar system the Sun consists entirely of plasma, its mass being three hundred and thirty thousand times larger than the mass of the Earth. The upper layers of the Earth’s atmosphere are ionized by the Sun, i.e., they consist of plasma. Many plasma phenomena are evident on a colossal scale in deep space. In our opinion mankind is entering into the space age which, to a considerable degree, is also a plasma age. This new stage in the growth of science and technology imposes increasing requirements on the youngest branch of physics, plasma physics.

(David Albertovich Frank-Kamenetskii, *Plasma: The Fourth State of Matter*, 1972, pp. 2–8 )

space is not empty. A percentage of atoms in space are positively charged due to the loss of one or more electrons. The resulting exceedingly thin medium, containing positive ‘ions’ and negative electrons, is plasma, sometimes called ‘the fundamental state of matter’ since it constitutes more than 99 per cent of the visible universe. The electromagnetic behaviour of plasma clearly distinguishes it from solids, liquids, and gases.

(Wallace Thornhill and David Talbott, *The Electric Universe*, 2008, p. 6 ) Thornhill studied physics and electronics at the University of Melbourne and subsequently became an independent scholar. Talbott is an independent scholar.

The properties of plasmas are of paramount interest in cosmical physics because most of the matter in the universe is in the plasma state. In the interiors of stars the gas is almost completely ionized ... Vast regions of interstellar space around the stars ... are highly ionized.

(Hannes Alfvén and Carl-Gunne Fälthammar, *Cosmical Electro-Dynamics: Fundamental Principles*, 1963, p. 14 ) Hannes Alfvén won the Nobel Prize for Physics in 1970. Fälthammar is Professor Emeritus at the Royal Institute



of Technology in Stockholm, where he succeeded Alfvén as Professor of Plasma Physics.

Most of the universe is plasma As astronomers began to realize that the universe is mostly plasma, they also came to the conclusion that plasma physics might help to explain many of the unanswered questions about how stars are created, and how they die out Plasma physicists began making important contributions to astronomy and cosmology in the 1950s Then, in the 1960s, startling discoveries burst upon the astronomers Quasars and pulsars, exploding galaxies and disappearing stars all clamoured for explanation In all of these exciting and strange new phenomena, plasma physics plays a key role For there are cataclysms exploding in the heavens of a violence undreamed of even a few short years ago And only plasmas are energetic enough to undergo such shattering catastrophes To understand what's happening in the heavens to understand how our own Sun and Earth were born and how they will die we must understand plasma physics The 'emptiness' between Sun and Earth, then, is actually a rich domain of plasmas and electromagnetic energies.

(Ben Bova, *The Fourth State of Matter: Plasma Dynamics and Tomorrow's Technology*, 1971, pp 28-31, 90 ) Bova is a popular science writer, former editor, and former President of the National Space Society in the USA.

It is often said that 99 per cent of the universe is in the plasma state The Earth's atmosphere, too, becomes a plasma beginning about 100 km above the Earth's surface

(Atsuhiko Nishida, *Atmospheric Plasma Physics*, Vol. 4, 1982, p. vii.) Nishida is Professor Emeritus of the Institute of Space and Astronautical Science in Japan

From the range of authoritative comment shown here, we can see now that there is an overwhelming consensus among scientists researching in this area that the Universe is mostly a plasma universe, and that what we call 'physical matter', or what I prefer to call 'atomic matter', since it is not plasma, must be very rare indeed. And plasma is the fundamental building block of atomic matter:

a plasma is the first state of matter out of which all the other states of matter originated  
Nature began with the plasma.

(Vinod Krishnan, *Introduction to Dusty Plasma Physics*, 2014, pp. 1, 2.) Krishnan is Senior Professor and Dean of Sciences at the Indian Institute of Astrophysics, Bangalore, India.

Nature began with the plasma. Cooling of the plasma converted it into a gas. Cooling of the gas converted it into a liquid. Cooling of the liquid converted it into a solid. That plasmas are the first state of matter out of which arose the other three states of matter has been amply

demonstrated. The ubiquity of plasmas in the universe needs no demonstration. The phenomenal diversity of plasmas is there all over the universe for all to see.

(Vinod Krishnan, *Plasmas. The First State of Matter*, 2014, pp. 1, 40 ) See above

### *Turning everything upside down*

Anyone who thinks he or she has never seen plasma hasn't been outside lately. As we have mentioned, the Sun and stars are made entirely of plasma. It seems likely that the giant planets Jupiter, Saturn, Uranus and Neptune are also made largely of plasma. There is a sphere of plasma surrounding the Earth, called the ionosphere. Above that is the magnetosphere, which was given its name in 1958 by Professor Tommy Gold.

The magnetosphere contains huge regions of plasma within the Van Allen Radiation Belts, which were named after their discoverer, James Van Allen, who found them in 1958. (Later we will learn the details of how that occurred.) We see plasma in thunderstorms, because lightning is plasma. Fluorescent lighting occurs when you turn on the switch and electricity shoots through a tube containing a gas such as neon; during the time it is turned on, that tube contains plasma. When you turn it off, the contents of the tube revert to ordinary neon again, which no longer emits light, and all the plasma is gone. Your flat TV screen contains plasma when it is turned on. So you see, plasma is everywhere and we see it every day that the Sun shines or when we are watching television. It is simply a matter of knowing what you are seeing (or not seeing).

In light of what we now know about the predominance of plasma in the Universe, we really need to turn our physics on its head. Instead of trying to model the Universe on the basis of the very rare and specialized form of dense matter found on our planet, we need to treat dense 'physical matter' as an exceptional form of the true 'universal matter', plasma. There is no use in our trying to establish universal laws on the basis of a tiny sample of far less than one percent of what exists. We need to establish physical laws on the basis of plasma and specify what we call 'physical matter' as a very

special and limited case, which has no justification for being used as a basis for describing the majority constituents of the Universe.

So drastic does our rearrangement of science need to be that we can take our present physics, shrink it and plonk it into a tiny corner of the representation of the wider truth, where it can describe those minority conditions appertaining to planets and other such 'solid' bodies, as a kind of footnote or addendum to a true universal science. None of our human scientific work so far need be wasted, for it can all provide a very useful account of what goes on in those rare, small 'solid' bodies where dense matter predominates and where such atypical conditions apply

Scientists residing in the plasma realm could read and study this with the greatest of interest, in the way that we study the strange conditions found in deep-sea thermal vents, astonished that such life forms can exist. Indeed, we as humans might even attract some useful attention to ourselves and find ourselves becoming a niche attraction, like bearded ladies in a circus.

We cannot therefore draw conclusions about universal truths based upon a highly divergent, atypical, and almost infinitesimally small percentage of what exists. We cannot be certain that any of our physics is universally applicable and hence 'true' in the sense that we have complacently assumed.

Before I begin the history of human encounters with and understanding of plasma, I want to return to the subject of a seemingly naturally occurring manifestation of plasma which, although relatively rare, is dramatic and may help us understand the descriptions of various religious phenomena in ancient history, as well as helping us to understand a way that plasmas such as the Kordylewski Clouds might interact with us

## *Great Balls of Fire*

Ball lightning has been puzzling people for thousands of years. It is surprising that, despite the fact that numerous photos and film of ball lightning exist, and the fact that it can even be artificially created in the laboratory (this was first achieved in St Petersburg in 1753 by Georg Richmann, though it killed him), there are still people who grumble and complain that it doesn't exist.

Ball lightning is a 'plasmoid', which is to say a blob of plasma. There are several fascinating books about ball lightning. One of them, *Ball Lightning* by Mark Stenhoff, published in 1999, has however the ominous subtitle *An Unsolved Problem in Atmospheric Physics*.<sup>1</sup> Ball lightning is indeed still an enigma, and it may have some connection with the Kordylewski Clouds, as I shall also explain later.

Very briefly, ball lightning is generally a spherical or nearly spherical glowing ball of fiery light that rolls along the ground or flies through the air, and sometimes passes through solid walls and emerges intact on the other side. It has sometimes been seen rolling down the aisles of passenger planes and frightening people.

The first book on ball lightning ever published in Britain, and the first I ever saw, was *The Taming of the Thunderbolts. The Science and Superstition of Ball Lightning*, by C. Maxwell Cade and Delphine Davis.<sup>2</sup> It was published in 1969, and I came across it and bought a copy in the very early 1970s. They used the word 'thunderbolts' to describe ball lightning, because that is what it was called in ancient times, and the early part of the book traces the history of accounts of what was probably ball lightning in the Bible (Ezekiel) and the classical authors Pliny and Lucretius up until modern times. They collected 107 case history accounts and in their

Acknowledgements they said that they spent five and a half years researching the book and wrote 'almost 1000 letters with correspondents in sixteen different countries'.

At the time the book came out and in the years immediately following, there were derisory reactions, and the authors were assailed by many scientists as having written about something that did not exist and was a mere fantasy. There are now hundreds of scientific publications about it, it has often been photographed, and there are many films of it easily available on YouTube. There is no doubt that it not only exists but has existed throughout the whole of recorded human history, and doubtless for the whole period of existence of our planet.

Ball lightning is indisputably electrical in nature (whatever theory one has for how and why) and has several characteristics in common with traditional descriptions of ghosts. For instance, if there is a high wind and a sphere of ball lightning appears in the air, it can move steadily against the wind as if the wind were not blowing. In other words, the wind does not appear to effect it in any way, even though the glowing sphere is generally rather small, so that it should be so light in weight that the wind would blow it away very fast. Spheres of ball lightning can also, as I say, sometimes pass through solid walls and emerge intact on the other side as if the walls had not been there. This is what ghosts are often claimed to do.

I am not necessarily suggesting that most ball lightning of the usual sort is intelligent, but it is also possible that some ball lightning phenomena are associated with intelligent entities, and are even 'plasmic drones'. I say this because a minority of reports describe their behaviour in such a way that suggests intelligent control of their movements, as they seem to be inspecting people and things, and also spotting, pursuing, and entering aircraft in flight, which presumably would be impossible for a mindless entity, or one that was not remotely controlled by an intelligent entity as a probe.<sup>3</sup>

Considering the existence of the Kordylewski Clouds, and my suggestion that they are intelligent, it makes sense that they would want to monitor what is going on here on Earth. And so what would make more sense than to have plasmoid reconnaissance? I therefore suggest that many of the balls of lightning and similar phenomena, and hence also many UFOs, are scouts

and surveillance drones operated by the clouds. The sudden movements observed in so many glowing UFOs, the right-angled turns, the rapid disappearances, the vast speeds, the ability to go underwater and re-emerge, and so on, all make instant sense if one assumes that they are probes from the plasma clouds.

The storage capacity for information of the two clouds, which together are nine times the size of the Earth, means that the entire history of humanity could be stored in them, as suggested earlier, and that the US National Security Agency's super-computers in Utah, which store all the telephone and internet communications on Earth, are ridiculously puny by comparison. It is impossible to resist the suspicion that the clouds know so much more about Earth events than all the security agencies in the world combined that any attempt to equal their surveillance powers would be futile. Plasmoid reconnaissance and surveillance drones would not need to be operated by anyone, but the clouds may have created robotic physical entities to act for them.<sup>4</sup>

In considering ball lightning further, there are certain fundamental texts that must be consulted. There is, for instance, a group of three inter-related books by three different authors who all assisted one another. Two of them were Americans with access to extensive files of defence contractors, NASA, and the US Air Force and US Navy, and the third was a British friend of theirs. The three books are:

*The Nature of Ball Lightning* by Stanley Singer (1971)

*Ball Lightning and Bead Lightning: Extreme Forms of Atmospheric Electricity* by James Dale Barry (1980)

*Ball Lightning: An Unsolved Problem in Atmospheric Physics* by Mark Stenhoff (1999).<sup>5</sup>

The authors of all three of these books shared the same basic bibliography, which is a truly enormous one. Singer's book (which lists 594 references in many languages) was largely funded by defence sources. As he says in his Preface: 'A major portion of the work was supported by the Office of Naval Research.' It was clearly through these defence contacts that many reports, translations of foreign works, and publications that have never been made

available to the public were included in the bibliographies and apparently shown to the authors for personal consultation.

These include, for instance, private reports or translations on ball lightning commissioned by the private defence contractors Raytheon Corporation and Avco Corporation (The latter company in 1960 built an experimental aircraft for the US Air Force that was shaped like a flying saucer or 'flying disc' As for Raytheon, 'everyone knows about them', by which I mean that one is continually reading and hearing that they are part of the 'military and security establishment'.) By looking through the bibliographies of these three books, we can see how seriously the American and Soviet governments were taking research into anything to do with plasma.

Numerous researchers thought ball lightning might be harnessed for weapons, such as the directing of balls of lightning at enemy tanks and planes. So, of course, when there is any possibility of devising new and improved ways of killing people, the money always pours in to support research. A very large proportion of the research that was carried out in America and the Soviet Union on ball lightning remains secret and will probably never be released.

Singer and Barry, mentioned above, collaborated on a joint paper delivered to the First International Symposium on Ball Lightning, which was held at Waseda University, Tokyo, on 4–6 July 1988. Singer was also an advisor to the Organizing Committee of the conference. The conference was attended by fifty-four scientists from eight different countries, under the Chairmanship of Professor Yoshi-Hiko Ohtsuki. The conference was held outside of government sponsorship or control, and was sponsored by a group of nineteen major Japanese corporations, including Fuji, Honda, and Sony. The Proceedings of the conference were published in 1988 and contain a great deal of important information, and although I have a copy myself, these Proceedings are now unobtainable for sale.<sup>6</sup> Anyone interested in ball lightning should try to find library copies of these important Proceedings.

Skimming quickly over some of the strange ball lightning phenomena that have been discussed at such length in numerous books and articles, with hundreds of case reports, we find that ball lightning can enter closed

rooms and buildings; it appeared frequently inside Second World War American submarines running along the floor; and it has often occurred in airborne planes. It also goes up and down chimneys, and it sometimes appears to 'inspect' things such as patterns on carpets; it can explode, it can be dangerous, and it can even kill people on rare occasions. Usually it is harmless, but sometimes it is deadly

Another more recent book on ball lightning is *Ball Lightning: Paradox of Physics* by Paul Sagan (2004) <sup>7</sup> This interesting book concentrates on classifying the bizarre phenomena associated with ball lightning, which the author often calls 'fireballs'. The author has headings such as 'fireballs endanger Hill Air Force Base', 'fireballs defy gravity', 'line rollers', 'flyers and bouncers', 'airplane crashes', 'dazzlers and hissers', 'mechanical damage', 'electrical and heat damage', 'electrical effects', 'trees emit fireballs', 'atop cooling towers', 'fireballs eat lightning', 'colliding fireballs', and 'shrinkers and expanders'.

These things are not made up, they are real phenomena. All of these bizarre events represent intrusions of plasma into our world of dense physical matter. Sagan has an important section called: 'Do Flying Fireballs "Think"?'. This is not as fantastic as it sounds. Here is some of what he says:

But fireballs possess sensory, energy generation, navigation and propulsion systems. Since ball lightning is buoyant, how come some fall rapidly from clouds like falling cannonballs, rebound before hitting the ground, and then float lazily against the wind or rapidly shoot back up to the clouds? How does a ball 'know' where an aircraft is, follow it closely and not be affected by the 500 miles-per-hour airflow and turbulence, and not just tumble or be swept away in the wind and turbulence? What possible detection, sensory, energy generation, navigation and propulsion system do fireballs possess? No other natural or man-made control feedback system matches their incredible behaviour

A microprocessor-based system or fireball with sensors that can materialize and fly, then detect electromagnetic, electrostatic, metal, solid objects, chimneys from a distance, distinguish a standing person from a post, and so on, would be an amazing feat of technology. But, for a supposedly hot ball of gas – it is not made of semiconductors and wires – to do these tasks of sensing, control and navigation is not a question for technology, but a mystery of physics <sup>8</sup>

Paul Sagan has made one major error in this passage from his book. He implies that these 'balls of gas' are not made of semiconductors and wires. On the contrary! As we will see in Chapter 11, plasmoids can indeed have the equivalent of semiconductors within them, and as for 'wires', Sagan is



referring to copper wires no doubt, but much more efficient means of carrying directed current exist than 'wires'! We have to stop thinking in terms of physically dense matter. As we will see shortly, semiconduction does not require physically dense substances like silicon and germanium microchips, and the transmission of current does not require wires of any kind!

Plasma equivalents of both semiconduction and wires are fundamental to complex plasmas, especially to plasma crystals. And it appears that some fireballs, or lightning balls, are indeed complex plasmas, and as we will see later, the ones that are of that kind can be full of internal 'cells', semiconductor regions, and filamentary current carriers galore. We have begun building the argument to show that internal structure self-organizes and 'emerges' from dusty complex plasmas, and some of the lightning balls are probably of that category of plasma.

There are so many fantastic aspects to ball lightning, recounted at great length in the various books and hundreds of articles, that it would be pointless for me even to begin to try to summarize them all here. Ball lightning has clearly often been responsible for some UFO sightings, and that is something that requires no imagination to understand. More troubling are the connections of ball lightning with poltergeist phenomena and spontaneous combustion of human beings. There are accounts of people having been burnt alive, but their clothes left unharmed by the 'fire', and sometimes even their skin has been left unharmed.

And as for poltergeist connections, lightning balls have been associated with strange incidents where the contents of closed rooms have been smashed as if by angry ghosts. Psychical researchers have often been called in to cases of apparently paranormal phenomena, which are associated with lightning balls, just as UFO researchers have often had reports of UFOs that turned out to be ball lightning.

Two other major efforts to deal with ball lightning in book form need also to be mentioned. The first is an entire volume on the subject issued by the Royal Society in London in 2002. This was edited by John Abrahamson.<sup>9</sup> It formed an entire theme issue of the Philosophical Transactions. This was a remarkable breakthrough for ball lightning research, because it showed that the highest levels of Scientific

Establishment respectability were being accorded to the subject within the civilian context (as opposed to the secret military and security contexts). In short, ball lightning research had now ‘come out of the closet’ No longer were stuffy scientists going to say that only cranks and lunatics could discuss this subject, and treat those scientists who dared to do so as renegades.

The Royal Society volume included a contribution by Stanley Singer, whose important book on the subject of 1971 (supported by the US Navy) I have already mentioned. At last he could come fully out of the shadows on this subject! The volume also included contributions by the Russian scientists Alexander Vladimirovich Bychkov and Vladimir Lvovich Bychkov, who have major international reputations. (Vladimir Bychkov is a co-editor of the book *The Atmosphere and Ionosphere: Elementary Processes, Discharges, and Plasmoids*, published in 2003 by Springer Verlag, which also contains some material about ball lightning.) The other publication deserving of attention, by the Torchigins, for reasons of space is described in a footnote.<sup>10</sup>

Going back a bit in time, in 1943, the Mexican scientist Manuel V. Cerrillo was the first person to suggest (in a report written in Spanish for the Mexican Government) that ball lightning is a ‘standing wave’ or ‘soliton’ phenomenon We will come to an examination of these in Chapter 11. What is important here is that lightning balls are, as I have already suggested, an example of extremely fine structures that are able to move through space and also through denser objects while keeping their shape and internal structure In this way one of the weird phenomena at the subatomic level described by quantum mechanics – called solitons – can also happen at the macro level in plasma.

On the other hand, ball lightning sometimes seems to shatter when it strikes a surface It can hit you with a whammy and electrocute you, or it might strike you and be harmless. The subject is still mysterious and there is a lot to learn. One thing does seem sure, namely that plasma is involved

I have seen ball lightning only once. My wife and I were driving one night during the 1970s on the road north from Banbury in England Olivia was at the wheel and I was in the passenger seat, and I saw a strange light sitting in a tree about fifty feet away to the left of the road. It was an eerie

glowing sphere of mixed red, white, pink, and orange light. My estimate of the size of the sphere is that it must have been about four feet across (about 1.3 metres). It did not move, it sat motionless on a tree branch.

Because my wife was driving very slowly on a dark two-lane road in our old Morris Minor, I was able to observe the ball for a minute or two clearly. It seemed to consist of a luminous gas, which was effervescent and fiery. If it gave out a sound or smell I could not have detected either, because of the noise of the car engine and my distance from the ball. (Ball lightning often hisses and gives off smells of sulphur or brimstone.) There was no thunderstorm activity going on at the time, and it was a quiet evening. So that is the sum of my limited personal experience!

My sighting was unusual in only two senses, first that the ball was motionless, and second, that it persisted for longer than usual, as ball lightning often vanishes very rapidly. I also had the uncanny feeling that the ball was 'alive', which I then decided could not have been true, but nevertheless, that was the subjective impression it gave, as I had a distinct feeling of being watched by it. That is the feeling one often has when being stared at from behind, and you turn around and there really is someone staring at you. And it was like the way that a barn owl perching on a gatepost seems to stare at you penetratingly in the flash of the headlights as you drive past it on a country road late at night. I wanted to go back and investigate, but there was nowhere to pull over, it was late, dark and cold, and so we did not bother.

I have on one other occasion had the impression that I was being 'observed' by a plasma, so I shall briefly mention the incident. During 2014 or 2015, my wife and I were asleep in a hotel room in Paris, where the usual flat screen plasma TV set was mounted on the wall. I woke up from a deep sleep suddenly, because I felt that someone was staring at me. I opened my eyes very quickly without moving, and I could see that the TV set had somehow turned itself on and had a grey screen showing visual static, with no sound at all. There was no broadcast being received, and the remote control was far from the bed and we had never touched it during our stay. I had the subjective impression that the TV set was alarmed to see that I had observed it watching me, and being on when it should not be, so it immediately turned itself off and faded to black.

That is the only time that has ever happened to me, but on a few occasions TV sets and DVD players have turned themselves on suddenly when I have been in the room, and in one case a machine spontaneously went through a sequence of three separate 'on' switches to start working of its own accord. However, on none of those occasions did I have the creepy feeling that someone was watching me.

One night in my office when I was working late writing something, the office printer turned itself on of its own accord and spewed out an A4 page with a photograph of my very close friend Michael Baigent, who had died not long previously. I had not touched anything but my keyboard as I worked on a document, and the printer had been turned 'off', remaining only on standby (i.e., the electric power was still on but the machine was off). The photo had been stored in my computer amongst hundreds of other photos and I had not looked at it for months. I took this as a 'Hello!' from my friend Michael.

When I told his wife Jane about it the next day and emailed her the photo that had self-printed, she was shaken, but very cheered up to think that he might have sent a message letting us know he was still alive, though 'dead'. But just so that we could not possibly misunderstand from whom the message came, there was Michael staring up at me from the paper with that mischievous look which he often had whenever he was telling me something especially provocative or unusual.

My own theory is that ball lightnings are charged plasma crystals containing a massive amount of microscopic dust particles, which become visible under certain conditions.

As early as 1955, the famous Russian physicist Peter [Pyotr Leonidovich] Kapitsa suggested that ball lightning was a spherical plasma.<sup>11</sup> He began his article of that year by saying: 'The nature of ball lightning is not yet understood.' That's for sure! His main question here is 'where does the energy for the ball come from?' He does many calculations and makes assumptions, some of which since 1955 have become obsolete, and are entirely based upon classical physics. I shall skip his discussions of energy sources, sizes, durations, wavelengths, etc., much of which I believe to be today irrelevant, and look instead at the part of his article that is still of continuing interest.

Kapitsa believed that lightning balls were formed in the following manner: 'Initially, there exists a volume of plasma, which is small . . . (and) weakly ionized . . .' But then it resonates with and becomes excited by radiation, which 'causes effective absorption of radio waves. Because of this, the ionization grows and with it also the initial volume of the sphere, which as yet has not reached a diameter ( $d$ ). Eventually, the resonance characteristics of the absorption process will be determined only by the geometry ...'

This may sound a bit confusing, but what I want to stress is his bringing in the essential matter of geometry. To my knowledge, nobody had ever done this before. He is referring to the geometry of radiation coming from 'a source of energy still unknown to us', which is 'outside of the volume of the lightning ball' and has created an electric field. In other words, he conceives of the electric field that supplies the energy for the lightning ball as having geometry.<sup>12</sup> (See the footnote for some further details of very great interest.)

It is not necessary for the reader to know any more of the complicated technical details than this. Kapitsa is invoking what we can now see is a crystalline structure of an electric field. Electric fields always have structure of some kind, which can be suggested by drawings of shapes of the fields using the device known as 'lines of force' as visual aids. But a crystalline structure is a different matter. It is a rigidly fixed pattern, which is a more ordered kind of structure, a higher level of order for a field. Such phenomena had never been imagined before.

Of course, Kapitsa did not think of it like that or 'see' that. He was (as my footnote makes clear) thinking of nodes, antinodes, and resonance points in the sense of their being action points or foci. He did not conceive of them as being joined in a structural entity. I look at this differently, and I see those points as vertices of a geometrical plasma crystal. But having adopted my conception of the plasma crystal, we can use Kapitsa's scheme and other similar ones as the internal structural maps of those crystals. And such resonance phenomena as Kapitsa invokes from his 'unknown energy source' could even be formative causes of the plasma crystals.

Readers may wonder about what it means to call a plasma crystal a crystal. After all, we are used to holding gems and quartz and such things in

our hands, turning them around, looking at them gleam, or wearing them in rings and bracelets, etc. What possible justification can there be for calling a cloud of plasma in space or a ball of plasma ‘crystalline’? Well, it is really a scientific convention, perhaps illuminated by words on ‘what is a crystal’ from an essay by Eugene Wigner, who won the Nobel Prize for Physics in 1963:

X-ray studies have revealed that most of the solid bodies in our surroundings are crystalline. This does not necessarily mean that they are formed by one single crystal – although even this can be true for bodies of such enormous size as icebergs. More commonly, they are polycrystalline, like the metal parts of ordinary tools, i.e., a conglomerate of microscopic crystals of various sizes. Crystalline in this connection does not mean a regularly shaped body of the kind we see in our crystallographic collections [such as museum crystal mineral specimens], but only that the grains have a regular inner structure arising from the arrangement of the atoms in surprisingly regular lattices.

The crystalline and polycrystalline substances constitute by far the greater part of all solid bodies found in nature. Practically all rocks are conglomerates of crystals, ice is crystalline, and so are all metals. The grains of sand are minute crystals and loam also is crystalline. Apart from the glasses and substances of organic origin, like wood, there are very few non-crystalline solids.

The enormous differences between the physical properties of different kinds of lattices make it evident that the forces holding the atoms or molecules together are very different – in the ionic lattices [the constituents] are charged particles. The electric forces between ions are very strong. These lattices are always so constructed that the positive ions are surrounded by negative ions, the negative ions by positive ones. Since opposite charges attract each other, there are considerable forces holding these lattices together.<sup>13</sup>

Wigner thus explains crystals in the wider sense to his readers: the constituents of a crystal (which for a plasma crystal means positively and negatively charged ions and particles) form a lattice. This means that the crystal has an ordered inner structure. As we will see later, this inner structure can be very useful in the storage of memory, computation and other faculties of intelligence.

And in space, plasma clouds that are crystalline are undoubtedly polycrystalline and consist of myriads of smaller crystals. If you or I were able to stand in space next to a plasma crystal we could only ‘see’ it if we had magic powers. Its constituent particles are far too small for the human eye to see, even with our microscopes. So there might appear to be nothing there. And such plasma crystals, especially if they are polycrystalline, can extend for gigantic distances. As Wigner pointed out, an iceberg can be a single crystal. And they can be huge. So we must never assume that a

plasma crystal, or a plasma polycrystalline cloud, need have any size restrictions such as a non-scientist might otherwise imagine. And frankly, there is no reason why such clouds cannot be the size of a whole galaxy.

From such a perspective, our local Kordylewski Clouds are tiny and verging on being insignificant. They only seem large to us. I will add one more thought: try and imagine the intelligence of a plasma cloud the size of a galaxy. People are always talking about 'intelligent life in space' and wondering where 'they' are. But 'they' may be hiding in plain sight. Considering that our sun is made of plasma and that stars are therefore also made of plasma, it is entirely possible that everything you can see in the night sky that is not one of our own satellites is alive and intelligent. Big red, white, yellow, and blue stars may really be the 'little green men'. Time to rethink.

In 1975, the British mathematician and scientist Harry Jones published a brilliant book about electrons.<sup>14</sup> The gist of it is that free energy in the form of electrons that are bouncing around in a crystal will form complete spheres.

This helped me to understand in more depth what Kapitsa said in 1955 and to develop my own ideas. When I read this, it became immediately apparent to me that if we visualize ball lightning as charged dusty plasma crystals, the fact that the surfaces of crystals containing constant energy form complete spheres when freely suspended in a medium, explains the spherical shapes of lightning balls, which has been puzzling scientists forever.

Convincing graphic evidence of the crystalline structure of ball lightning may be seen in an astounding photo taken in 1955 by a Swiss amateur photographer named F. Goepfert, which was published for the first time in 1965.<sup>15</sup> I reproduce a section of this black and white photo in Figure 4. The full photo shows three successive images of ball lightning flashes side by side, which because they took place within 40 to 100 microseconds of each other all appeared on the same photo (which had an exposure time longer than that).

The portion reproduced here (reduced from three to two images because of space) shows two of them side by side. They are essentially identical. (The third, not shown here, was the same.) What this demonstrates is that

the visible electric charges were following the same complex paths repeatedly within the same crystalline structure. Otherwise, the flashes would have been random and would have varied, but they could not have replicated themselves.

We need to think in terms of three dimensions when looking at this two-dimensional image, noting that some of the lines cross one another when seen on the flat, but that is an illusion because of flattening the three-dimensional image. The electricity was in fact flowing along surfaces, points, and interstices and turning at vertices within the crystal. A clever geometer could probably even reconstruct the crystal from the path of the electric current. This kind of behaviour is typical of the phenomena studied in a new discipline known as 'topological physics', where currents run along edges and hinges of solid geometrical forms. Plasma crystals have geometrical configurations, with surfaces (called 'boundaries' when speaking of plasma), edges (or 'hinges'), and vertices (or 'nodes').



Figure 4 A portion of Goepfert's photo taken in 1955 showing two of the three identical current paths of arc-mode current flashes travelling through the same lightning ball and occurring microseconds apart so that they all appeared on the same photograph side by side. This evidence substantiates the theory of ball lightning being charged dusty plasma crystals. If plotted in three dimensions, the current path would help us to reconstruct the invisible host crystalline structure. If the current paths had been randomly created, they could not have been the same like this. Just to be clear, this is a photo not of a lightning ball itself but of current flashes travelling through part of a



lightning ball, showing only a portion of that ball, which is why the image itself does not look like a ball!

We have just seen Eugene Wigner's helpful explanation of crystals that are not the solid objects with which we are all familiar. Plasma crystals are not solid and they are made of charged particles and ions, containing a crucial admixture of microscopic dust particles that make the crystalline structure possible. Most of them are invisible to our eyes and weigh essentially nothing.

As I explained early in this book, when I stressed that the Universe is made of 99.9 per cent plasma, so that solid dense matter is very rare and atypical, so I must now stress that it follows that plasma crystals are very common and pieces of quartz and gems are very rare. We must not take what is familiar to us in daily life as the basis for trying to understand the Universe, as that gives us a wholly distorted picture of reality. Let's put it like this: no one living in the plasma universe would have any interest in our quartzes and gems made of atoms of dense solid matter. They are only important to us. We need to stop being flat-Earthers and 'get real'.

This means that there may be 99.9 per cent more plasma crystals in the Universe than there are dense matter crystals like quartz. So if we can get our heads around that, we can begin to see the light. We simply have to keep struggling to pull ourselves out of an Earth-centric view of things and get a plasma-centric one instead, if we want to understand the Universe properly.

This has all kinds of implications. Plasma crystals are capable of being fantastically complex, and complex in an ordered and dynamic way needed for intelligence.

In this chapter we have seen that ball lightning, made of plasma, has the ability to move through solid objects with its form unchanged. In this it exhibits the same weird behaviour that is observed in the quantum realm in the form of what are called solitons. We have seen that complex dusty plasmas contain crystals that give them form, and we shall see later are crucial to understanding why plasmas may develop intelligence.

In the next chapter we will look at human experience of the intelligent behaviour of plasma phenomena in ancient times, some of which seem much like experience of lightning balls.

In Chapters 7–10 we will look at the observations, research, calculations and theories of astronomers and astrophysicists regarding plasma in space in modern times.

In Chapters 11–13 we will see how work on plasma in laboratories has confirmed and intertwined with the work of the astronomers and astrophysicists.

In Chapter 14 we bring all this together to summarize the arguments that complex plasma can be intelligent. We will see that intelligence of complex plasmas such as the Kordylewski Clouds may not be exactly like ours, and speculate that it may be more like the artificial intelligence and quantum computers now in development.

Then in the last section of the book, Chapters 15–17, we will look at the plasma inside our bodies and ask what the implications are. Is our own intelligence in some way dependent on this plasma?

## *When Heaven Was Young*

For the whole of recorded human history, many traditions and tales have survived where humans in a state of meditation or reverie have encountered glowing balls of fire of a divine nature. Let us take a look now at some of these ancient accounts. They provide historic evidence of great importance to us.

About two thousand years ago, there was a very widespread religious tradition in the Middle East and Mediterranean based upon what we would now call plasma entities. It was a 'light-theology' called Gnosticism. There were many 'schools' and groups and churches of Gnosticism, somewhat similar to the way in which there are many Protestant sects today. The word 'gnostic' is a modern invention, which scholars use to describe them collectively. It comes from the Greek word *gnōsis*, which means 'knowledge', but amongst the people we now call the Gnostics, the word took on a deeper meaning of 'sacred knowledge', or of 'higher knowledge'.

The Gnostics believed that an elect group of people of spiritual inclinations who pursued sacred knowledge would constitute the section of the human population, who would survive the vicissitudes of the corrupt world of physical matter, and after their physical deaths would enter a Kingdom of Light, in which resided a variety of plasmic deities culminating in 'the Father'. This was a name they used for the highest god of all. Jesus used this very term himself and instead of speaking of the Kingdom of Light, he spoke of the Kingdom of the Father. The light emitted by 'the Father' is described in Gnostic texts as being stronger than 10,000 times 10,000 suns. 'The Father' had no physical body, but was essentially what might perhaps be called a light-ball, or plasma-ball. Those who were

‘saved’ would themselves put on ‘vestures of light’ and become mini plasma-balls and would live forever in a heavenly plasma world

In the lengthy and well-preserved Gnostic text known as the Pistis Sophia, the following conversation between Mary Magdalene (who in the Gnostic tradition was one of the main disciples of Jesus) and Jesus is recorded:

Maria came forward. She worshipped at the feet of Jesus and said ‘My Lord, be not angry with me, that I question thee. For thou hast once said to us “Seek and ye shall find.” My Lord and my Saviour, of what kind are the twenty-four invisible ones, and of what type, or what form are they, or of what form is their light?’

Jesus answered however and said to Maria ‘What is there in this world that resembles them, or rather, what place is there in this world that is comparable to them? Truly, truly I say to you, the twenty-four invisible ones are lighted ten thousand times more than the light of the sun which is in this world, as I have already said to you at another time. For the light of the sun in its true form is not in this place, because its light passes through a multitude of veils of places. But the light of the sun in its true form, which is in the place of the Virgin of the Light, is lighted ten thousand times more than the twenty-four invisible ones and the great invisible forefather and also the triple-powered God, as I have already said to you at another time.

‘Now at this time, Maria, there is no kind in this world, nor light, nor form, which compares with the twenty-four invisible ones, but yet a little and I will take thee with thy brothers, and fellow disciples to all the places of the height. And you will look forth upon the whole world of mankind, and it will become the size of a speck of dust before you as a result of the great distance.’<sup>1</sup>

Gnosticism was strong in both Judaism and in Christianity, though we know that it existed in Judaism long before Jesus, so was earlier than the earliest forms of Christianity. We should bear in mind that Jesus was not a ‘Christian’ but a Jew. ‘Christianity’ had not been invented yet. It was named later, based upon his sayings, after the Greek word *christos* meaning ‘anointed’, which was itself a direct translation of the Hebrew word *messias* that we pronounce Messiah, which also means ‘anointed’.

The Jewish Gnostics had an esoteric and secret reinterpretation of the Old Testament texts, maintaining that the Book of Genesis was an allegory. Some extremely strange interpretations are put forward in their writings. For instance, they maintained that Noah did not really build an Ark at all, but that he hid inside a glowing light-cloud, which we would call a plasmoid.<sup>2</sup>

The Gnostic texts are full of descriptions of plasma and plasmoids, often in surprising detail. When gathered together from the many texts that we now have (vastly expanded by the discoveries at Nag Hammadi in 1945, the

finally edited, annotated and translated texts of which became available at last towards the end of the twentieth century), a whole world of plasma entities is revealed. Gnosticism conceived of an entire Plasma Universe. It seems that ancient seers were able to perceive clearly what we are only now able to demonstrate scientifically and recreate in advanced modern laboratories.

Manichaeism, founded by a prophet called Mani, once stretched from Europe to China, though it has now vanished. It too was a 'light-religion' describing plasma phenomena, its origins lying partly in the earlier Gnosticism. Gnosticism itself survived as a mass movement until the extermination of the Cathars in southern France during the Middle Ages, and the fading away of the Bogomils of Bulgaria and the Messalians of Slavic Europe at some unknown time, apparently by the sixteenth century.

The most famous example of an intelligent glowing plasma in ancient 'Western' religious literature is probably 'the burning bush' encountered by Moses on the top of Mount Horeb in Sinai. I should point out to all the modern tourists who mistakenly climb Mount Sinai that it is the wrong mountain, Mount Horeb being further south and rarely visited because there is no easy way up it; at its summit is a magnificent Temple of Hathor, whose cult image was the face of a calf. A golden Hathor calf of that temple was the 'golden calf' of the Bible, though no one has realized this yet.

The Moses story is well known to all Christians and Jews, and to Muslims as well (since Muslims are 'Abrahamic' by tradition, and Moses preceded Abraham). The account is to be found in the book of Exodus (3:2), the second book of the Old Testament of the Christian Bible as well as of the Jewish Torah. Moses encountered this brilliantly shining and burning plasma, which spoke to him, and he described it as being like a burning bush that was however not consumed by its own flames. In other words, it was not a real bush but was round and 'burning' as if it were a bush, which is the only way a person of that early pre-scientific time could hope to describe it.

The voice may have been audible to the ears or it may only have been 'mentally audible' (telepathic). Although many deeply religious people who do not necessarily study the texts carefully believe that the burning bush was 'God', or Jehovah, the text is not clear on that point. It says actually that 'the Angel of the Lord' appeared to Moses as a burning bush, not that

the Lord himself appeared to Moses. That is very different! In one of the translations, the English Standard Version, we are told: 'And the Angel of the Lord appeared to him [Moses] in a flame of fire from the midst of a bush ...'<sup>3</sup>

The Septuagint is also confused, because although the apparition is said to be 'the Angel of the Lord', the Lord himself is also apparently watching, and when he sees Moses approaching, he too cries out from the bush himself and calls Moses by name, telling him not to approach closer. So who was it, the Angel of the Lord or the Lord himself? As I say, this is not at all made clear by the text.

This confused story seems to have only one reliable element to it, in the absence of the original Hebrew text, which was lost more than two thousand years ago, and that element is the bush-like burning apparition that 'did not consume itself' but continued to burn apparently without any fuel. In other words, this seems to be a description of an encounter with a glowing plasma ball, or blazing plasmoid, which spoke. And encounters with such apparitions are to be found throughout the religious and sacred literatures of many countries over the millennia, and are also recorded by the more mystically inclined ancient Greek philosophers.

In fact, what is described as happening to Moses is something that has happened countless times to sages, shamans, meditators, yogis, and holy men throughout the ages. An analysis of many of these encounters could shed a great deal of light upon the interactions throughout history between 'spiritual' plasma forms of beings, whether 'higher entities' or deceased persons.<sup>4</sup>



Figure 5 The Angel of the Lord speaks to Moses from the Burning Bush (top left corner) The snake may refer to the transformation of Moses' staff This image is from an illustrated Latin Bible of 1567

The great scholar of Judaism, Gershom Scholem, argues that the figure known as Moses (whether mythical, real, or partially real and partially mythical) seems to have been responsible for changing the religion of the Jews into a monotheistic religion, and for treating the earlier Jewish ideas as 'heretical'. But those 'heresies' persisted nevertheless for centuries, and today we describe them as 'Gnostic Judaism'. They were in turn taken over by 'Gnostic Christianity', which was as ferociously persecuted by the Roman Catholic Church (self-styled 'Christian orthodoxy') as the Pharisees were by the Sadducees (self-styled 'Jewish orthodoxy'). But now we turn away from Moses to consider another early Jewish prophet, Enoch.

Here is an encounter of the prophet Enoch with divine radiance as recounted in the Book of Enoch, in which we must note the mention of an entity called 'the Great Glory', which is reminiscent of 'Angel of the Lord', who was called 'the Glory' by the Samaritans:

And the vision appeared to me thus, behold in the vision clouds invited me I drew nigh to a wall which is built of crystals and surrounded by a fiery flame and it began to affright me And I went into the fiery flame and a flaming fire surrounded the walls of the house, and its portal blazed with fire And I entered into that house, and it was hot as fire

And lo! There was a second house, greater than the former, all the portals of which stood open before me, and it was built of flames of fire And its floor was fire, and above it were lightnings and its ceiling also was flaming fire And I looked and saw therein a lofty throne as a shining sun And from underneath the great throne came streams of flaming fire so that it was impossible to look thereon And the Great Glory sat thereon and His raiment shone more brightly than the sun and was whiter than any snow A flaming fire was round about Him, and a great fire stood before Him And until then I had had a veil on my face, and I was trembling<sup>5</sup>

Later Enoch also relates: 'And they took me away to a place where there were forms like flaming fire, and when they wished they appeared as men.' In other words, he is describing higher beings who normally had the forms of plasma entities, but who could take on human form for interactions with humans. It should be noted that the Book of Enoch is an ancient Jewish work, dating from before the time of Jesus, which clearly discussed divine beings capable of incarnating as men. The Book of Enoch is regarded as a canonical work of scripture by the Ethiopian Orthodox Church, which is one of the earliest Christian churches.

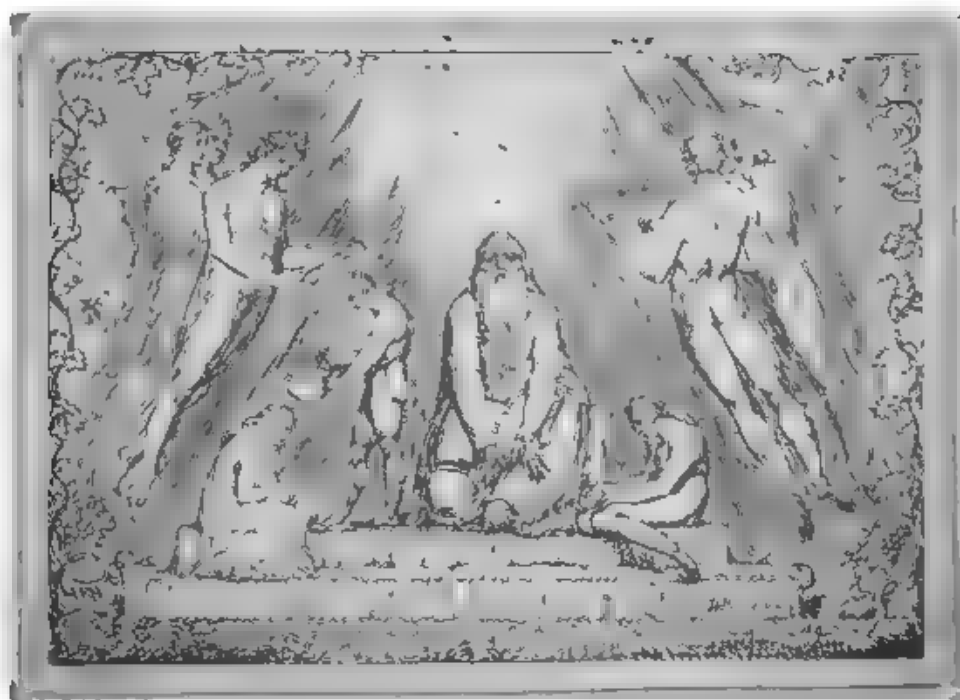


Figure 6. William Blake's 1807 lithograph of Enoch in Heaven

The Platonic philosopher Damascius (458-550 AD) believed that the human spirit was 'a radiant body filled with heavenly radiance, a glory that



streams through its depths, and lends it a divine strength; but in lower states, losing its radiance, it is dirtied, as it were, and becomes darker and darker and more material.’<sup>6</sup>

The philosopher Philoponus of Alexandria (490–570 AD) believed that this spirit was a higher soul attached to the basic soul. In other words, he believed, as did the ancient Egyptians, in more than one level of soul for each person. He wrote: ‘There is, moreover, beyond the soul another kind of body, that is forever attached to the soul, which they call radiant or starlike . . . (and) it forever keeps its radiant body, which is of an everlasting nature.’<sup>7</sup>

The Jewish Gnostic treatise discovered at Nag Hammadi in 1945, *The Apocalypse of Adam*,<sup>8</sup> features Adam speaking to his son Seth and saying that before he and Eve were thrown out of the Garden, they had gone about in a radiant and glowing condition. He says that when the descendants of Seth return eventually from Earth to the divine regions, they will all become clouds of great light. And he also speaks a great deal in general about radiant clouds of glory.

In the early Christian Gnostic text discovered at Nag Hammadi in 1945, entitled *Marsanes*,<sup>9</sup> the narrator says: ‘The third shape of the soul is spherical.’ There is considerable unanimity amongst many of the mystical texts of antiquity that men and higher entities alike have souls that are radiant and glowing spheres. Men who become too attached to Earth cease to radiate light and go dark, thus resembling the fallen angels who have become demons of darkness.

Another Nag Hammadi Gnostic text, *The Paraphrase of Shem*,<sup>10</sup> is full of descriptions of heavenly ‘clouds of fire’, ‘garments of light’, ‘luminous spirits’, ‘images of light’, ‘the power of the restless fire’, ‘the light of spirit’, ‘the exalted, infinite light’, ‘clouds of power’, ‘clouds of light’, ‘the cloud of silence which is a majestic fire’, ‘garments of fire’, ‘a power of fire and light’, ‘thought that comes forth from the light’, and says: ‘The righteous spark is the cloud of light that has shone in your midst.’

Ideas such as the garments of light and fire seem as if they might allude to the presence of plasma in and around the human body, which we will return to in the final chapters of the book.

One of the most famous and impressive of the Nag Hammadi texts is *The Apocryphon of John*,<sup>11</sup> which is dated to the early part of the third century AD. It is full of descriptions of 'luminous clouds'. Such a luminous cloud is mentioned in particular in the text's alternative story of Noah. The text says that the story of Noah and the ark 'is not as Moses said' [Moses was here presumed to be the author of the Book of Exodus], but the true story is very different. We are told that Moses was wrong in saying of Noah that 'He hid himself in an ark' because he had been warned that the flood was coming. The text insists that it was 'not Noah alone', but 'also other men'. And we are told that 'They went into a place and sheltered themselves within a luminous cloud.'

The text also speaks of angels as being 'lights'. However, it is not only the good entities, but also the bad entities who reside in luminous clouds. The Gnostic name for the Devil is the Chief Archon, also called Samael, Yaldabaoth, and Saklas (which means 'the Fool'). The text tells us that the Chief Archon 'created for himself an Aeon [a special place] that burns with a luminous fire, the one in which he exists now'. (The Gnostics altered the meaning of the ancient Greek word *aiōn* and used it in their own peculiar way. The term 'Aeon', the Latin form that we use in English, occurs constantly in their texts.)

In other words, the Devil himself lives in a fiery plasma cloud. So consequently, both the powers of Good and the powers of Evil dwell in or consist of plasma clouds. The War in Heaven is thus a war between good and bad plasmas, and the extent to which they can recruit humans on their respective sides is assumed to have a bearing on how long the world will last before it reaches its ultimate climax when the final reckoning occurs. At that time, the 'elect' amongst humanity, who have remained good despite all temptations, will rise up to the Kingdom of Light, and the powers of Darkness will be annihilated.

Humanity has been inundated with such accounts of what we would call, using the terminology of science, divine plasma entities, for millennia, but most people have tended to disregard them as either fantasies, or the enthusiastic reveries of people who were not entirely sane. But they constitute massive evidence of phenomena experienced by sensitive and meditative persons in all cultures round the world. Now at last science has

caught up with mysticism, and modern physicists are seriously suggesting that intelligent plasma beings can exist after all.

Are plasma entities to be regarded as helpful or harmful to us? The traditions are explicit that they can be both. But the helpful ones are radiant with light, whereas the harmful ones are dark and perverse, as their light has been contaminated and made obscure with the dirt of corruption. It is time that humans were given a proper briefing on this 'material world of the spirit'.

This is a short survey of some of the myriad descriptions of light phenomena in ancient religions. Of course, key events in the New Testament, such as the Transfiguration where Jesus appeared radiant in glory and the Pentecost where tongues of light appeared hovering over the heads of the Apostles also seem suggestive of plasma and plasmas

### *Aristotle's pneuma*

Although the word 'plasma' was only coined in 1928, some thinkers in the ancient world had an idea of it. For reasons of space, I am going to confine myself to two examples where the ancient examples are startlingly close to our modern ideas.

Something very strange was going on in the fourth century BC, and I call it Aristotle's Anticipation of Plasma Physics and Bioplasma. Aristotle (384–322 BC) is often thought of as a rather dry character, who wrote profound philosophical tomes that only very serious-minded people try to read. However, the real Aristotle was very different; he published two books of poems and three of his poems actually survive. Another thing is that he freed all his slaves, some during his lifetime and all the rest in his will.

One of the reasons he had to flee Athens for his life when he was sixty-two years old is that he had written an ode to his deceased wife, and the high view he had of women was considered offensive to the male chauvinists of ancient Athens, who liked to keep women in their place, i.e., either on their backs or sitting at the spinning wheel, and not allowed out of the house without chaperones. Furthermore, Aristotle was that horrible and despised thing, a foreigner; he was born in the north of Greece and he was a resident alien in Athens.

Significantly for this volume, Aristotle was the first Western thinker to postulate the existence of a rarefied form of matter entirely separate and wholly different from physical matter. He named it *aithēr*, which we spell ‘aether’ or ‘ether’ today in English (and the old-fashioned English spelling was ‘aethre’, though no one uses that spelling anymore). Since physical matter was then conventionally spoken of as made of ‘earth, air, fire, and water’, Aristotle called his new form of matter ‘the fifth element’. In Latin this is *quinta essentia*, which is the origin of our English word ‘quintessence’. This was the first time in recorded history that plasma had been anticipated. I am still struck today by the startling boldness of Aristotle, who also questioned the nature of matter in such a fundamental way.

Aristotle’s aether was viewed by him as a form of matter that existed in the pure state only in what today we would call ‘outer space’, but was then called ‘the region above the moon’. Aristotle thus anticipated our modern knowledge of plasma in physics. If he were alive today, Aristotle would not be surprised to be told that the Sun was entirely composed of plasma and that the space between the Sun and the Earth was filled with a solar wind made also of plasma. For this is what he had predicted.

Aristotle went much further than only proposing that there was a higher form of matter. He actually proposed that each living physical body had a corresponding aetheric body, or what is now called by some modern scientists a ‘bioplasma body’ (We will hear much more about bioplasma bodies later on.)

His writings on this subject are mostly lost and survive only in fragments. Some of those lost writings were dialogues rather than treatises. It is little known today that Aristotle was as famous for his dialogues in his own day as was Plato. But such are the vagaries of what survives and what does not that not a single one of Aristotle’s dialogues survives in its entirety, and those fragments that do survive as quotations by Cicero and others are tantalizing in their brevity. We are somewhat luckier with what are called the ‘testimonia’, which means the descriptions of, rather than the quotations from, the lost dialogues. But even so, we get only a glimpse of Aristotle’s discussions of his theories of a fifth element.

It is worthwhile giving a bit more detail about what Aristotle believed, since few classical scholars have made a proper study of this aspect of his

ideas. The scholar who has advanced a study of this subject the most is Professor A.P. Bos of the Netherlands, who publishes most of his writings in English. He has ‘cracked the code’ of many of Aristotle’s ideas, which have been only partially preserved, and this has taken him decades. Much of the information that made this possible is to be found in the philosophical dialogues of Cicero, in the writings of Philo, of Clement of Alexandria, and in a fascinating essay by Plutarch of the first century AD entitled ‘On the Face which Appears in the Orb of the Moon’.

The original key book by Bos in which he began to discuss these questions is entitled *Cosmic and Meta-Cosmic Theology in Aristotle's Lost Dialogues* (1989), but Bos has worked steadily on the subject since that time and continues to find out more and more about the subject.

In the book just mentioned ([here](#)), Bos tells us of Aristotle’s fifth element:

This new element is according to Aristotle a soma [physicality] and can therefore be counted among the ‘natural somata’ [plural of soma]. But it does not share the hylē [substance] of the four earthly corpora [elements]. For this reason it is described as ahylon [possessing no hylē, or physical body], as a kind of ‘immaterial matter’. While maintaining his belief in the divinity of the celestials [divine beings] and their eternal existence, Aristotle bases this stance on his own new theory of the fifth element – the celestial spheres [consist] of the divine fifth element.

Aristotle also believed that the divine beings as well as human spirits were made of the fifth element, and that when we die our spirits made of the fifth element return to the world of the fifth element, which he conceived of as being somewhere above the atmosphere. And of course he viewed all stars and the Sun as being made of aether. And he distinctly postulated, under the name of *pneuma*, the existence of a form of the fifth element within animal and human bodies as an animating principle, for the details of which see the footnote. These beliefs of his later had an influence on the fundamental concepts of Christian theology, especially the Gospel of John.<sup>12</sup>

I won’t go into more detail here about these ancient ideas, as fascinating as they are, but I want readers to know that more than 2200 years before Crookes discovered his ‘fourth state of matter’, Aristotle had predicted it. That is more than a footnote to history, it is an extraordinary fact.<sup>13</sup>

I say Aristotle was the first Western thinker to suggest such a thing, because the Chinese philosophers of Daoism never accepted a dichotomy between matter and spirit. Such a dichotomy is entirely a Western

phenomenon. The Chinese have always maintained that 'spirits' were made of a very special rarefied kind of matter like a mist. So deep do these concepts go in Chinese thinking that it is very difficult to find a Chinese person alive today who does not 'believe in ghosts' implicitly. They always seem to have believed that very wise people never really died, but that their physical forms were transmuted into what they call *xian* (spelled *hsien* in the old spelling), which is pronounced similarly to 'shenn'.

These wise, deceased shamans were conceived of as living in remote mountains and forests and flying through the air and the clouds with the greatest of ease, thinking profound thoughts and enjoying the delights of heavenly contemplation. As for most other people, they became ghosts, which were a much lower grade of being, but also made of the same rarefied semi-matter. Psychologically disturbed ghosts were dangerous, and they haunted people and places. The female ones were the most dangerous of all, and were known as 'fox fairies'. They would lure men to their doom and destroy them like vampires.

A very large proportion of Chinese fiction over the ages has taken the form of ghost stories, because of the Chinese preoccupation with rarefied entities made of what we today would call plasma. Anyone who enjoys atmospheric ghost stories should read those by the most famous Chinese author of them, Pu Songlin (1640–1715), one of my favourite authors, and whose house I have visited in Shandong Province.

However, living in the Western world as we do, I do not propose to write a history of the Chinese beliefs in ghosts through the ages, or even the various texts that discuss such matters, or how they also anticipated modern plasma in a somewhat vague manner. I thought it important to mention it, for the history of the world does not consist solely of the history of the West. But I will pass over the Chinese sources, because it would require a lengthy account indeed to explain the differences between Chinese and Western thinking, which is a vast chasm of incomprehension, alas, and impossible to explain in a short space. Suffice it to say that a plasma world would be less surprising to the Chinese than to Westerners.

As for genuinely proto-scientific speculations anticipating plasma, I am not aware of the Chinese having produced any. It was the Daoists (old spelling: Taoists) who promoted these ideas. They were well aware that the physical sense of sight was incapable of perceiving certain forms of matter,

which were invisible. Liezi (Lieh Tzu, fifth century BC) says that rarefied matter 'eludes the senses of sight, hearing, and touch, and is therefore called by the name of Yi.' The Chinese character for this Yi is the same as is used in the title of the famous divination book called Yi Jing (old spelling: I Ching, 'The Book of Change'), and therefore also has the meaning of 'change', or one might better say, 'what changes'.

Laozi (Lao Tzu, uncertain whether sixth or fourth century BC), the founder of Daoism, speaks of the invisible primaeval matter in this way: 'The likeness of things unseen: the form of that which is without body' And he says: 'What you cannot see by looking at it is called Hi (rarefaction, or vacancy) .. That which eludes the sense of sight is called Hi.' He also says that Hi and Yi are the same.<sup>14</sup>

However, we must resist the temptation to investigate Chinese Daoism further, as it is an endless subject. The point to note here is that Laozi attributed bodiless form to what we now call plasma. He was thus not simply speaking of some primaeval sludge invisibly sloshing around us like an undifferentiated sea, but he was aware that it must be structured. One could stretch a point and say this is the ancient prehistory of the concept of a plasma crystal!

Before we leave ancient teachings on plasma, I want to return briefly to recent discoveries, which we discussed in Chapter 4, that plasmas precipitate matter and that matter is also otherwise precipitated out of 'nothing'. These recent scientific discoveries also resonate with ancient wisdom.

Various religions from different parts of the world suggest the creation of matter as coming from 'speech'. In Christianity, we are told: 'In the beginning was the Word (*logos*), and the Word was with God and the Word was God .. all things were made by Him and without Him was not anything made that was made.' In the earliest form of Hinduism, the Universe was said to be created by Brahmā, who is an all-embracing universal spirit. He opened his mouth to speak and he spoke the four Vedas, which are the ancient collections of sacred hymns that the Aryans brought with them from Iran when they invaded India from the West circa 1500 BC. The Vedas are considered the most sacred of the Hindu scriptures, and are written in an archaic form of Sanskrit known as Vedic.



In ancient Egypt, the god Ptah was said to have created the world by his speech. The wall texts of the Tomb of Rameses VII in the Valley of the Kings state of the Sun: 'His speech is light'<sup>15</sup> And in the ancient Egyptian text known as the *Book of Caverns*, which was preserved in the Transverse Chamber of the Osireion at Abydos, we read of the Sun, whose name is Re: 'Re speaks to them through his light.'<sup>16</sup> The ancient mystical concept of the Logos in Johannine Christianity also suggests that 'the Word' (of God) was light.

Sacred speech is essentially something that emerges from something else, just as our breath is emitted from us into the air around us. It seems that the ancient peoples when referring to the creative speech of the primal god were trying to convey the concept of expelled, structured breath entering into a surrounding medium but retaining its own form, and thus constituting matter

Since we now know that the Universe is a seething ocean of plasma, and as it has now been proven that plasma makes dust, and that dust is matter, it is legitimate to consider that the 'material Universe' has been extruded from and created by the universal plasma. In other words, the 1 per cent is the creation of the 99 per cent. And looked at from that perspective, the traditional religious views of the creation of matter are justified. For the spontaneously formed dust and the baryons are the building blocks of the familiar world around us.

But if we look back to our ultimate origins in the world of physical matter, we are all children of plasma. The Egyptians would say we are 'the progeny of Ptah', the Christian view is that we are 'the children of God', and a Hindu might say: 'We are all the creation of the great universal spirit, Brahmā'. The other early creation legends of 'in the beginning was undifferentiated chaos' or as the ancient Egyptians said, the goddess Nut, who was a great cosmic sea, and the Torah and the Old Testament that speak of 'the waters', are all effectively saying the same. On this view, all physical matter did indeed emerge from the vast universal sea of plasma.



## *Kristian Birkeland's Miraculous Discovery*

Kristian Birkeland (1867–1917) is famous in Norway, and his picture was until recently on their 200 kroner banknote, so between its appearance in 1994 and its withdrawal in 2018, the Norwegians were reminded of him every day when they went shopping. He was a very brave man, who spent years freezing in the Arctic wastes in the north of Norway making detailed observations of the Aurora Borealis, or Northern Lights as they are often called. He concluded that the Northern Lights (and there are southern ones too at the South Pole, known as the Aurora Australis) must be caused by streams of charged particles pouring in from the Sun towards the Earth's poles. These particles then glow and cause all the beautiful lights.

This theory caused the utmost outrage, and astronomers all over the world called Birkeland a madman. Did he not realize that space was empty? Charged particles could not pass through empty space! And so instead of facing Birkeland's carefully presented evidence, the world's 'astrophysical community' stuck with their insistence upon empty space and decided that Birkeland was a crank. He died unrecognized in 1917. His theories about the Aurora were not proved true until spacecraft verified them in the 1960s. Because Birkeland is one of my heroes, I was active in certain minor ways in helping to facilitate the 2017 Oslo Birkeland Centennial Conference to celebrate his great scientific work.



Kristian Birkeland appeared until recently on the Norwegian 200 kroner banknote. Image reproduced with the kind permission of the Bank of Norway. Copyright by Norges Bank, artist Sverre Morken. This banknote was legal tender in Norway between the years 1994 and 2018.

Before we go into the subject of the solar winds and the Birkeland Currents, it is important to have a very brief history of how their existence came to be recognized. And that means knowing how and when the polar aurorae came to our attention and the early attempts to understand them. Naturally, it is the peoples of the North who saw them all the time, and a thirteenth-century Norwegian saga called *The King's Mirror* (*Kongespeilet*, dated to AD 1220–1230) contains a reference to them. It mentions ‘those lights .. which the Greenlanders call the northern lights’.<sup>1</sup>

Although the Northern Lights are rarely seen so far south as Greece or Rome, they were certainly witnessed by Aristotle, who described them in his lengthy book *Meteorology* as:

burning flames in the sky ... we often see a burning flame of the kind one sees when stubble is being burnt on ploughland ... Sometimes on a clear night a number of appearances can be seen taking shape in the sky such as ‘chasms’, ‘trenches’ and blood-red colours ... the upper air condenses and takes fire and ... its combustion sometimes produces the appearance of a burning fire.<sup>2</sup>

It has been suggested that Aristotle may have seen the Aurora Borealis twice, in 349 BC and again in 344 BC.<sup>3</sup> We must remember that Aristotle was born and grew up in the north of Greece, and lived for some years in Macedonia as an adult as well, thus having spent much of his time at a higher latitude than Athens. Aristotle theorized that a vapour rose from the Earth that collided with the Sun’s fire above the atmosphere, where it was

ignited, and thus produced the colourful flashes in the sky. He stated that there was a layer of a strange kind of 'fire' encircling the Earth above the air, thus clearly anticipating the later discovery of the ionosphere by Balfour Stewart in 1887, 2,119 years after the death of Aristotle. The quotation from Aristotle in the footnote is truly astonishing in its anticipation of the nature of the ionosphere.<sup>4</sup>

Aristotle may have been influenced in his thinking by Homer. In the *Iliad* (Book 2, 412 and Book 3, 277-9), Homer describes the chief god Zeus as aether-dwelling (*aitheri naiōn*), meaning that he resides in the blazing and dazzling aether of the heavens above the sky. Much is made of this by the first-century AD Homeric commentator, Herachitus the Grammarian (not to be confused with the famous philosopher of the same name, who lived centuries earlier). In his work *Homeric Problems*, he cites this Homeric concept specifically in relation to the Aristotelian tradition. He suggests that the name of Zeus may derive from the word *zesin*, which means 'boiling', because of the intense fiery heat of the aether. He mentions Aristotle's followers saying of aether that it is 'distinct from fire' and 'they regard it as a fifth element'.<sup>5</sup>

It should be noted that Aristotle made an intensive study of the variant texts of Homer and even travelled to the island of Ithaca to obtain a copy of the Ithacan version of the *Odyssey*, from which he compiled his own edition of the epic. It was well known in antiquity, though it is now lost. Indeed, it was Aristotle's editions of Homer that Alexander the Great, his pupil, carried with him on his conquests and kept under his pillow every night, as recorded by contemporary historians.

The aurorae had been witnessed in Greece prior to Aristotle ('a fiery body of great size like a burning cloud was observed in the heavens. It did not remain at rest, but moved in various directions ... [with] violent swaying . . .'), but the earliest surviving written account of this phenomenon is found in the *Life of Lysander* (12, 4) by Plutarch (AD c. 46-125), four centuries after the time of Aristotle.<sup>6</sup> Aristotle's text is therefore the earliest surviving text in the world referring to the Aurora Borealis, and of course he did not merely describe the aurorae, he attempted to explain them scientifically as well.

Both Seneca (4 BC–AD 65) in his *Natural Questions* (I, 14, 1),<sup>7</sup> and Pliny (AD 23–79) in his *Natural History* described the Northern Lights.<sup>8</sup> But after that, apparently nothing was published about them for approximately 1500 years (the Norwegian saga mentioned earlier being of course an oral saga, not a publication).

The astronomer Tycho Brahe (1546–1601) mentioned them in passing, the astronomer Johannes Kepler (1571–1630) witnessed and described them, and Galileo (1564–1642) witnessed them at Venice in 1621. It was apparently Galileo who introduced the name *Aurora Borealis*, in a publication of 1616, though in a descriptive sense rather than with an intention of naming them, and it is not known whether he had actually seen them yet. It is thus not clear whether Galileo should be credited for naming the *Aurora Borealis*, or whether that honour belongs to Pierre Gassendi, who is usually credited with it, and who had obviously read Galileo and seen his descriptive reference. Perhaps we should split the credit between them. In 1619, Galileo attempted to explain the Northern Lights, with similar ideas to those of Aristotle.<sup>9</sup>

It was in the same year of the Venice auroral display, 1621, that the French scientist, scholar and philosopher Pierre Gassendi (1592–1655) formally used the name ‘*Aurora Borealis*’ to refer to the Northern Lights, in honour of the ancient Greek goddess of the dawn, Aurora. Gassendi was a keen observer of the heavens, including studying sunspots and observing the transit of Mercury across the Sun. He even successfully predicted an eclipse in 1654. He was only twenty-nine years old when he ‘named’ the *Aurora Borealis*, despite the fact that he had apparently not then seen the Northern Lights personally. It is believed he came to know of them through his early friendship with the astronomer Joseph Gaultier de la Vallette (1564–1647), and by reading the recent accounts of them by Galileo.

In 1640, Spanish colonizers in Chile recorded a large auroral display in the Southern skies, which lasted from the beginning of February to the end of April, but this remained only a locally known matter in Chile for the next 142 years, for it was only in 1782 that the Chilean Jesuit priest Juan Ignacio Molina SJ (1740–1829) became the first European to report in print this and other subsequent Spanish accounts of the existence of a southern aurora, which was otherwise unknown in Europe.

In 1716, a German professor of both theology and mathematics named Christoph Langhansen (1691–1770) published a pamphlet in Latin at Königsberg entitled ‘De Aurora Boreali Quam Germani Das Nord-Licht Appellant’ (‘Concerning the Aurora Borealis, Which the Germans Call the Northern Lights’), containing an impressive fold-out engraving of particularly bizarre auroral phenomena, which I have reproduced overleaf, along with a scan of the title page. I bought a fragmentary copy of this booklet, only the first ten pages of the extremely rare 28-page work, but fortunately the illustration was present.

The work appears to suggest that the Aurora Borealis is a spiritual phenomenon, which is hardly surprising, in that the author was not only a theologian but a practising preacher, who was five times a rector of a Lutheran church. The author refers to numerous publications by earlier authors, including Girolamo Cardano, Philippe de la Hire, Valentine Weigelius, Giovanni Domenico Cassini, Giovanni Battista Riccioli, Schmieder [unknown which Schmieder is meant], and René Descartes. Frankly, this suggests that there may have been a great deal of discussion of the aurorae going on during this time of which I have no knowledge, although it would certainly be an interesting subject to investigate for someone who cares to go into the matter in greater depth, to see what all these people were saying. This is a wonderful subject for somebody’s future PhD thesis.

54102

AUXILIANTE DIVINO NUMINE  
DE

12.

# AURORA BOREALI.

QUAM GERMANI

**Das Wort: Licht/**

appellat

A. c. 1716. d. 17. Martii

observata.

*Consensu Amplissima Facultatis Philosophicae,*

PRÆSIDI

**CHRISTOPHORO Banghansen/**

Mathematicum Prof. Extraord.

RESPONSURUS DISSEPT

**CHRISTIANUS HENRICUS Gütther/** Reg. Boruff

Phil. & S Theol. Stud.

IN AUDITORIO MAJORI.

d. Jan. h. c.

REGIMONTI, Locus REUSNERIANIS.

scripsit ab eo

4.  
A. G. 1716



Figures 7 and 8 The title page and the fold-out engraving of the 1716 publication about the Aurora Borealis by Christoph Langhansen, from my imperfect copy of this rare work

A forerunner of Kristian Birkeland whose publications have been largely forgotten is an early French scientist, who seems to be remembered today only in France itself. His name was Jean-Jacques d'Ortous de Mairan (1678-1771). He was active in many fields of science, but even amongst the French it seems to be little known today that he was the first person in the history of science to suggest that material from the Sun was not only being transmitted across space to the Earth, but actually deposited within the Earth's atmosphere.

His magnum opus on this subject was a very lengthy book with many illustrations entitled *Traité Physique et Historique de l'Aurore Boreale*, published in 1735.<sup>10</sup> This material was widely circulated in Europe at the time and the book was translated into German in 1753.<sup>11</sup> De Mairan stated that material from the solar atmosphere crossed space, reached the Earth, and caused the Aurora Borealis in our own atmosphere. He claimed that the atmosphere of the Sun was a light and tenuous fluid, which 'reached as far as the Earth'. This is a surprisingly accurate guess for a man in the eighteenth century, since it is reasonable to describe plasma flows as 'a light and tenuous fluid'. His words, translated, are: '... the matter composing this [solar] atmosphere coming to meet the upper parts of our air ... falls into the terrestrial atmosphere at more or less depth ...'.

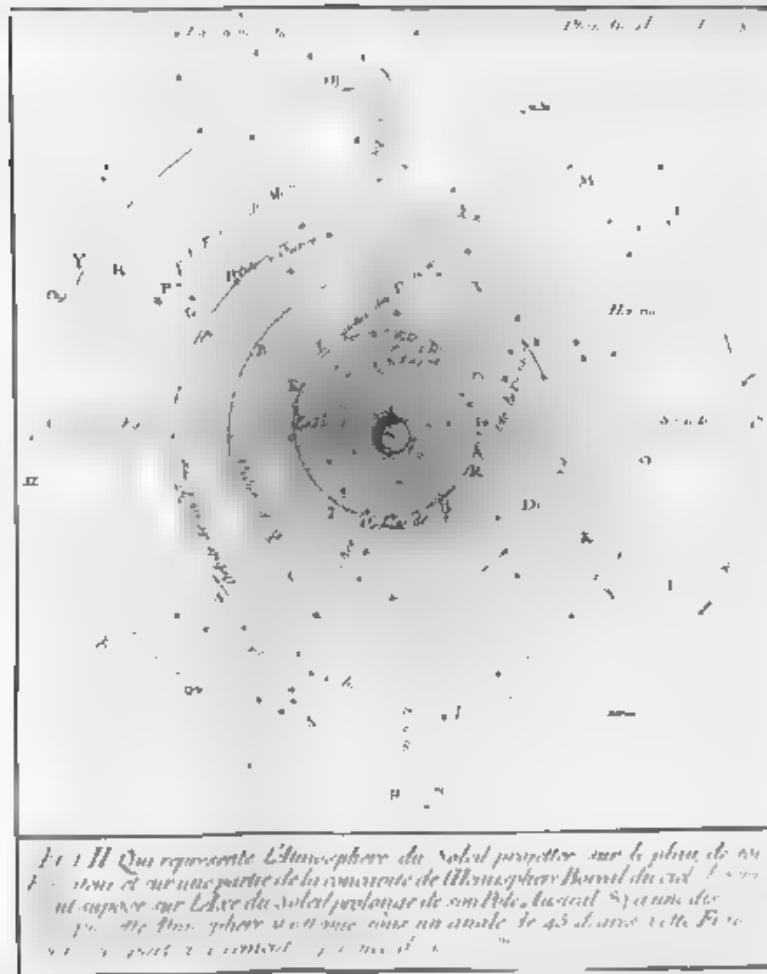


Figure 9 This engraving of 1733 shows the 'Sun's atmosphere', as conceived of by de Mairan, extending from the Sun (shown in the centre and labelled with the capital letter S) to the orbit of the Earth (Orbite de la Terre). The solar atmosphere is represented in the drawing by the shaded portion, which is largely comprised within the orbit of the Earth. On p. 22 of his book, de Mairan describes the solar atmosphere as being 'a spheroid which has been flattened at its edge into the form of a circular disc'. De Mairan's concept of the solar atmosphere that reached the Earth partially arose from the researches by his Swiss contemporary Nicolas Fatio de Duillier (1664–1753, whom he calls simply 'Fatio') concerning the distance between the Earth and the Sun.

In his own caption de Mairan says 'This represents the atmosphere of the Sun. It is projected on a map of the Equator and on one section of the concavity of the Boreal hemisphere of the sky. The centre is superimposed upon the axis of the Sun projected onto the astral Pole at such a distance that this atmosphere is viewed at an angle of  $45^{\circ}$ ' (From Jean-Jacques d'Ortous de Mairan, *Traité Physique et Historique de l'Aurore Boréale* (Physical and Historical Treatise Concerning the Aurora Borealis), Paris, 1733, the second folding plate following p. 32.)

Since de Mairan first announced these ideas in 1731 to the Royal Academy of Sciences in Paris, he anticipated Kristian Birkeland's first announcement of similar ideas, which also took place in Paris, in 1900, by



169 years De Mairan also published many illustrations, including some spectacular ones of the aurorae. He may probably thus be credited with being the first predictor of what we now call the solar wind.

In 1767, Knud Leem (1697–1774) published a book in Danish entitled (in translation) *An Account of the Lapps of Finmarken*. In it, he described how the Lapps of Lapland in the far north go hunting with guns for foxes by the light of the Aurora Borealis. He said: ‘This kind of sport (!) the Lapps pursue at night when the moon is up, or when there is an Aurora Borealis, which in that country, during the winter nights when the air is clear, is as intense as if the sky were on fire, and which, in a manner, shines like the most brilliant moonlight.’ Leem even published an engraving of the Lapps doing this, depicting the auroral streaks in the sky behind them providing the necessary illumination.<sup>12</sup> This and the Langhansen illustration of 1717 are surely two of the earliest depictions of the Aurora Borealis ever published.



Figure 10 Knud Leem's drawing of 1767 showing the Lapps of Lapland hunting foxes on the ice at night, by the light of the Aurora Borealis

In 1745, long before Molina's publication, the mariner Antonio de Ulloa y de la Torre-Giral (1716–1795) witnessed the southern aurora from his ship as he rounded Cape Horn, but his reports of this appear to have remained oral ones amongst sailors until long afterwards. In 1770, Captain James Cook (1728–1779) observed the southern aurora on his first voyage to Australia. But this seems not to have been reported in print at the time and to have remained recorded only in his log. In 1773, Captain Cook observed the southern aurora again on his second voyage to Australia, and he gave the Southern Lights the name of 'Aurora Australis'. Cook died three years before Molina's publication publicly reporting the existence of the Southern Lights.

In 1812, the English scientist Sir Humphry Davy (1778–1829) published his opinion, in his essay ‘Of Electrical Attraction and Repulsion, and Their Relation to Chemical Changes’,<sup>13</sup> that:

The coruscation [flashing and glittering] of the Aurora Borealis, and Australis, precisely resemble strong artificial electricity, discharged through rare air – the Auroras may arise from a discharge of electricity, accumulated in the atmosphere near the poles.

In 1845, inspired by and referring back to Sir Humphry Davy, Baron Karl von Reichenbach (1788–1869) published his theory (in German, published in English in 1850) that the Aurora Borealis ‘appears to be nothing else than an electric phenomenon, caused by the magnetism of the earth’.<sup>14</sup> He had constructed terrelles, meaning small magnetic spheres as miniature models of the Earth, which had generated lights at their two magnetic poles.<sup>15</sup> In this, he anticipated by many decades Kristian Birkeland’s more sophisticated and famous experiments in Norway; Birkeland also constructed terrellas to replicate the auroral effects with miniature spheres containing an electro-magnet in their interiors.

In 1862, the Swiss physicist Arthur-Auguste de la Rive (1801–1873) published a paper concerning both the Northern and the Southern Aurorae.<sup>16</sup> He had been studying the aurorae since 1849

Nearly a century passed after Molina’s publication before any major developments concerning a sound understanding of the aurorae appear to have taken place, however. In 1878, Karl Selim Lemström (1838–1904), a Finnish geophysicist of Swedish extraction, published an article in Swedish in a Finnish periodical based upon his extended observations of the Northern Lights in Scandinavia.<sup>17</sup>

In his article, he reported that as a result of his studies over a considerable time, he had come to the conclusion that the auroral phenomena varied with the sunspot cycle of eleven years. That is a cycle during which the Sun goes from having a maximum of sunspots to having a minimum of them, and back again. No one knows why it does that. (At the time of writing, we are at the minimum.) He said that in his opinion, the aurorae were caused by electric currents in the Earth’s atmosphere, which were stimulated by what he called ‘heat rays’ coming from the Sun. Electric currents were still imperfectly understood at this time, and it was only in this same year, 1878, that Henry Augustus Rowland (1848–1901) carried

out his famous ‘Rowland Experiment’, which showed that electric current consists of moving charges.

Not knowing about charged particles constituting the electric currents, Lemström was in no position to conceive of electric currents as charged particles actually coming from the Sun. He also still thought that space was empty, which must be why he could only conceive of ‘heat rays’ coming from the Sun. But Lemström was an important precursor of Birkeland, who took his work very seriously. Lemström published his book *L'Aurore Boréale. Étude Générale des Phénomènes Produits par les Courants Électriques de l'Atmosphère* (*The Aurora Borealis. A General Study of the Phenomena Produced by the Electric Currents of the Atmosphere*) in 1886.

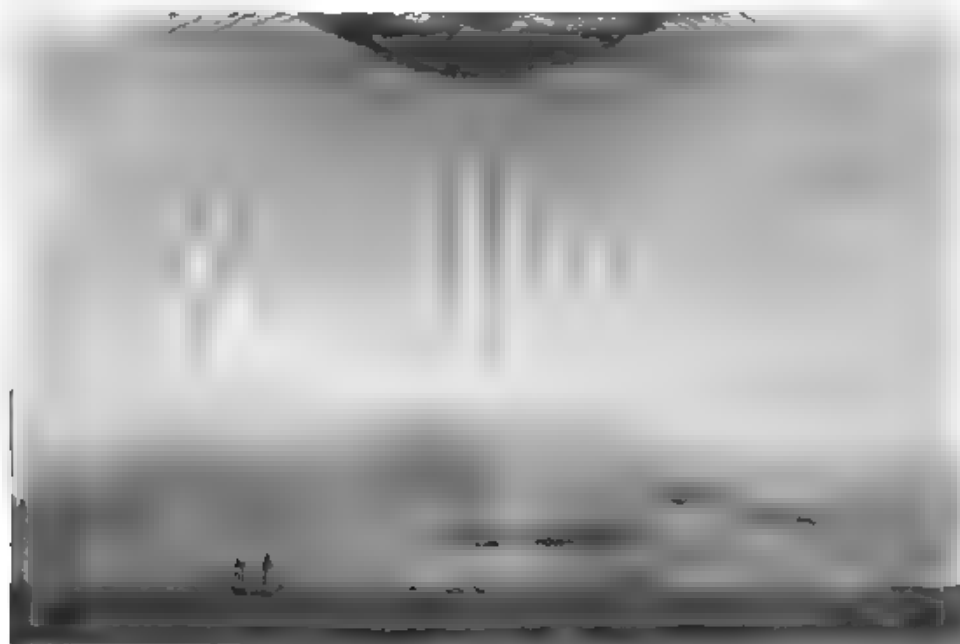


Figure 11 One of the many spectacular colour illustrations of the Aurora Borealis published by Lemström

The next year after the publication of Lemström’s original article, in 1879, the Danish scientist and photographer Sophus Tromholt (1852–1896) noticed when he was visiting Lapland in Norway that the area of sky covered by the Aurora Borealis increased in size and spread southwards when solar activity increased in accordance with the eleven-year sunspot cycle, thus confirming Selim Lemström’s assertion of the previous year regarding the clear association of the Aurora Borealis with some kind of

solar influence, correlated with what Lemström called ‘changes in the solar surface’, i.e., the sunspots.

In 1885, Tromholt published a massive two-volume work in English entitled *Under the Rays of the Aurora Borealis*, containing 150 illustrations.<sup>18</sup> Selim Lemström and his work are mentioned, but the names of Kristian Birkeland and another auroral researcher, the Danish scientist Adam Paulsen, are not (Paulsen had begun publishing, in French, his important observations concerning the Danish auroral expedition of 1882–1883 in 1884.)<sup>19</sup> Tromholt published a remarkable image of one of Lemström’s amazing experiments in producing an artificial aurora shooting up into the sky from a mountain top. That took place in 1882.

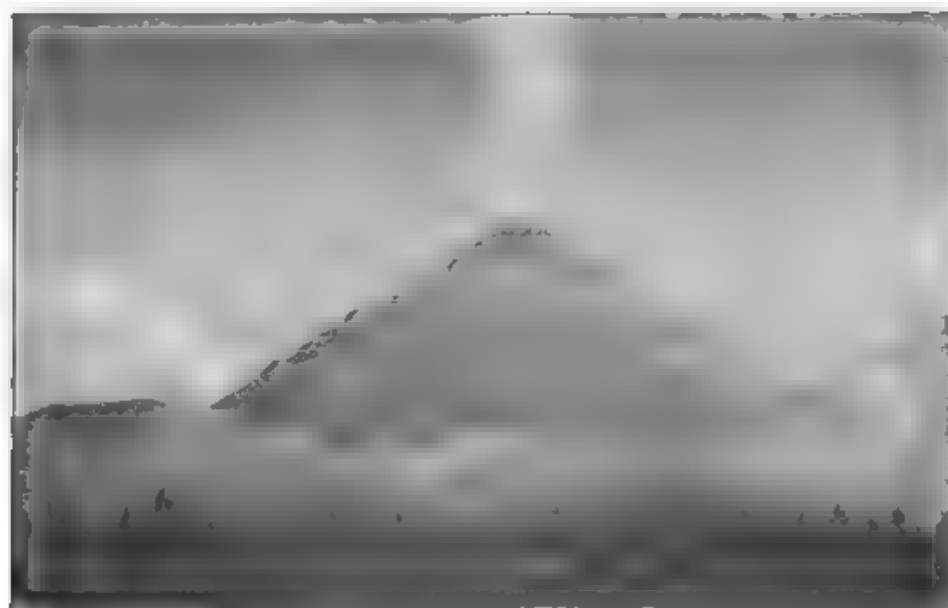


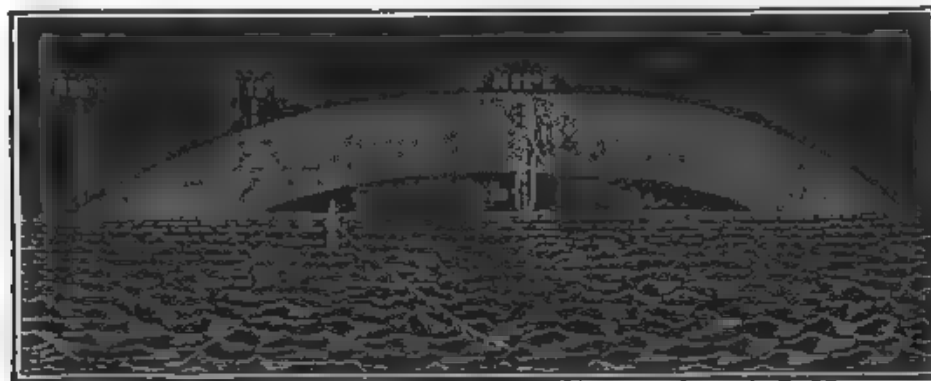
Figure 12 Tromholt’s depiction of Lemström’s experiment of 1882

A major advance in understanding the electrical nature of the Earth’s atmosphere took place three years after this, when in 1882 Balfour Stewart (1828–1887) suggested that there was an entire electrically conducting layer lying above the air and cutting across the Earth’s vertical magnetic field, thus being the first person to suggest the existence of what we now call the ionosphere since the time when it had first been suggested by Aristotle

In 1884, the Danish scientist Adam F.W. Paulsen (1833–1907) published his account of the Danish Polar Expedition of 1882–1883. And in the same year, Adolf Erik Nordenskiöld (1832–1901), a Swedish Finn, published an

elaborate account in French '*Sur les Aurores Boréales*' ('On the Aurora Borealis') in a French scientific journal, extracted from his account of the Vega Expedition to the North during the winter of 1878-1879, his original extract concerning the Aurora Borealis having been published two years earlier, in 1882, in Swedish.<sup>20</sup> (The *Vega* was the name of a ship on which he sailed in search of a Northeast Passage, and on which he got frozen into the ice near the Bering Strait. So he had plenty of time to observe the Northern Lights as he sat there trapped.)

There were many interesting illustrations published by Nordenskiöld. The accounts by Paulsen and Nordenskiöld are extremely important, and although I have their original publications (including even two personally signed by Paulsen), in the interests of brevity I shall refrain from discussing them here. A typical observation by Paulsen is that the electric currents in the atmosphere were strong in the winter and weak in the spring. The conscientious and diligent attempts by these two men to gather information concerning the Aurora were a significant part of the progress in understanding the phenomena.



Arc large à éclat uniforme aperçu le 14 mars 1879 à 9<sup>h</sup> 20<sup>m</sup> du soir.

Figure 13 An illustration shown by Nordenskiöld in scientific form, with all the angular measurements precisely given and the *Vega* stuck in the ice.

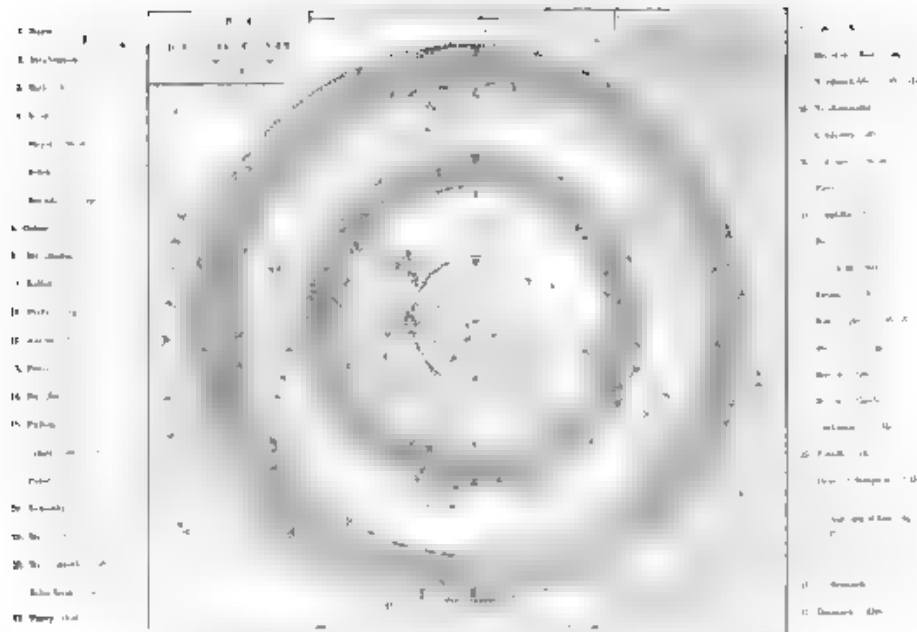


Figure 14. Nordenskiöld's plotting of the regions of the Earth where visibility of the Aurora Borealis had been reported. The North Pole is shown in the centre

In 1896, Kristian Birkeland, one of the most brilliant scientists of his time, began publishing the great breakthroughs. He hypothesized that the Sun emits rays of electricity ('cathode rays'), which reach the Earth and are 'the object of a suction' by the Earth's magnetic poles, and that there is a correlation between sun-spots, the Earth's polar aurorae, and terrestrial magnetic perturbations.<sup>21</sup>

Birkeland's theories as expressed in 1896 are not well known, as they are mentioned in an exceedingly rare book of his published in French in 1901.<sup>22</sup> I purchased a copy of this book from a book dealer in Paris. It was inscribed by Birkeland to his friend, the famous French scientist Henri Becquerel (1852–1908, winner of the Nobel Prize for Physics in 1903, who discovered radioactivity), and it had thus obviously come from Becquerel's personal library. When I sent an email to Professor Alv Egeland in Oslo, with whom I was then frequently in touch, telling him about this find, he said it was the only one of Birkeland's publications of which there was no known copy in Norway, and he had never seen it, although he had listed it in his bibliography of Birkeland's publications. Alv is the biographer of Birkeland and the world's leading expert on him.<sup>23</sup>

A popular book about Birkeland by Lucy Jago, entitled *The Northern Lights*, was published in 2001, but without footnotes or references<sup>24</sup> In the Selected Bibliography, Jago does list the 1901 book by Birkeland, so presumably she consulted the single copy of the book that is in the British Library. (It is possible that there are only the two copies in existence today, mine and that one ) Jago begins her book dramatically with a description of events in Finnmark during the 1899 expedition.

As a result of my discovery of the little-known book, I now know that Birkeland formulated his theories of electric currents coming from the Sun many years earlier than had been thought. When discussing these theories of Birkeland, people generally cite his well-known book published in English in two instalments, in 1908 and in 1913, concerning the Norwegian Auroral Polar Expedition of 1902–3, which is widely available today in numerous print-on-demand reprint editions.<sup>25</sup>

But that was the third such expedition, and the book that I discovered concerns his earlier expedition of 1899–1900, and it contains sections on ‘Electric Current in the Higher Layers of the Atmosphere’ (16 pages), ‘Artificial Auroral Bands’ (20 pages), etc. It pushes back the timetable of Birkeland’s insights considerably from what we had assumed and shows how many more years he laboured at these ideas than had been thought.

As an example of how incorrect dates can spread and become accepted without question amongst the scientific community, we see this statement in Alexander Piel’s excellent book *Plasma Physics*, published in 2010:

The space between Sun and Earth is filled with the plasma of the solar wind. This is a flow of charged particles from the Sun, whose existence was first conjectured, in 1908, by the Norwegian physicist Kristian Birkeland ...<sup>26</sup>

But Birkeland first published his ‘conjectures’ on this subject in 1896, twelve years earlier than Piel believes, and it appears that everyone has been assuming that Birkeland’s 1908 book was his original publication of these ideas.

What is important for us here, and what makes Birkeland one of the great heroes of this story, is that having followed in the footsteps of his near-contemporary Crookes in studying the influence of magnets on cathode rays in vacuums, he conjectured that electron beams from the Sun were being



guided towards the Earth's magnetic poles in a similar way. He developed a theory in which energetic electrons were ejected from sunspots on the solar surface, directed to the Earth, and guided to the Earth's polar regions by the geomagnetic field where they produced the visible aurora

In 1913, Birkeland also may have been the first to predict that plasma is ubiquitous in space. He wrote:

It seems to be a natural consequence of our points of view to assume that the whole of space is filled with electrons and flying electric ions of all kinds. We have assumed that each stellar system in evolutions throws off electric corpuscles into space. It does not seem unreasonable therefore to think that the greater part of the material masses in the Universe is found, not in the solar systems or nebulae, but in 'empty' space (Quoted on Wikipedia with no reference )<sup>27</sup>

In 1916, Birkeland was probably the first person to predict successfully that the solar wind behaves as do all charged particles in an electric field: 'From a physical point of view it is most probable that these new solar rays are neither exclusively negative nor positive rays, but of both kinds.' In other words, the solar wind consists of both negative electrons and positive protons and ions (The quote is from Wikipedia with no proper reference.)

I shall not tell the fascinating story of Kristian Birkeland's life, because that has already been done. Lucy Jago's book about Birkeland the man is a good place to start, and Alv Egeland's book about Birkeland the scientist gives all the other important information one needs. Since Birkeland was such an outstanding genius, both books are highly recommended, as more people need to know about him.

Since Isaac Newton (1643-1727), science and the world had moved towards a material mechanical view of the Universe, picturing solid objects in dead and empty space, held in orbit by gravity. It was a picture to inspire a certain cold wonder, perhaps; gravity was king here. Then Birkeland discovered that electric currents travelling from the Sun were entering Earth's atmosphere. This was a profound and important mystery because electricity can't cross empty space.

It would be another forty years before two scientific geniuses solved this mystery and began to build up a picture of the Universe filled with a web of electrical impulses like a macrocosmic brain.

## *The Cosmic Web*

In 1933, the Swiss astronomer Fritz Zwicky (1898–1974) was observing the Coma galaxy cluster through the large telescope of the Mount Palomar Observatory in California when he saw an anomaly. He had been making calculations about the galaxy's luminosity and when he compared his observations with his gravitational calculations, he saw that they showed wide discrepancies. So he concluded that unseen matter must exist there to account for the gravitational forces.

He would call this unseen matter *dunkle Materie* (Dark Matter).

And as regards 'dark matter', which would eventually become widely accepted in the scientific community, my position is that one does not need to invent strange new kinds of matter, since it is plasma in different states (gaseous, liquid, solid, etc.) that is in 'the dark mode' and hence invisible to us. This fits perfectly with what we now know about the Universe consisting of 99.9 per cent plasma, bearing in mind too how hard it has been to photograph or even find the Kordylewski Clouds.

But what is important for this book and this chapter is that Zwicky produced evidence to show that space is not empty. Until then 'outer space' had been assumed to be totally empty, consisting of a perfect vacuum, with the exception of the solid orbiting bodies such as planets, moons, asteroids, etc. within the solar system and stars outside it. In other words, no medium was recognized. What happened to Zwicky after his discovery is an example of how blind and stubborn ignorance can hold back our understanding, because of the 'tactics of ignoring' new findings by the self-styled 'Establishment'.

The expulsion of solar material into supposedly 'empty' space was discovered from observation in 1936, three years after Zwicky's discovery,

by the French astronomer Lucien Henri d'Azambuja (1884–1970), while he was using the Observatory Telescope in Paris to look at the fiery material spewed out by the Sun.

After d'Azambuja's discovery of the solar wind, astronomers simply ignored it, as they had ignored Zwicky. Many famous astronomers continued to insist in the most vehement fashion that space was 'empty', and this remained very much the Astronomical Establishment's position. There is nothing like 'establishments' of all kinds to ignore advances and new findings, and try to retain the status quo! And we must never forget that there is a status quo of ignorance, which is precious to the mediocre minds incapable of original thought who make up 'the Establishment'.

During the early 1940s, Zwicky tried to publish further evidence that space is not empty, but publication of his findings was refused by every astronomical and physical journal in the world. The Establishment derided and insulted him and closed ranks to try to prevent his findings from ever being made public. Finally, in 1950, Zwicky was able to get around the boycott of his discoveries only by turning to a biology journal, *Experientia*, which extraordinarily agreed to publish his astronomical findings so that he could somehow get them into print.

It enabled Zwicky's ideas to be circulated at last, even if only in offprints from a biological journal no astronomer had ever seen or heard of. It eventually became clear that the censorship of Zwicky's findings had been illegal, especially considering that his own observatory's committee had acted to ban publication of his findings in all American astronomical journals, which they had no legal right to do. This remains one of the great scandals in American science, and also of Swiss science.

However, the situation has become even worse today, for now it is not only observatory committees that prevent things from being published, but also the organized and combined forces of military, security and corporate power. Most scientists working in astrophysics in America today have signed confidentiality agreements with military agencies, and a large proportion of their work is kept secret under various security classifications, many of which are wholly unnecessary. If the scientists try to release their findings, they can go to jail. Even when some such documents are 'released' in redacted form under Freedom of Information laws, the release is often only technical.

For instance, one relatively uncontroversial scientific report commissioned by the CIA decades ago that I wished to see, as it had been officially 'released' some years ago, can only be seen if you make an appointment and go in person to the CIA archive in Maryland, where you cannot copy it or take notes.

It is remarkable what a short time ago it was that all the world's scientists insisted that outer space was empty. In 1961, the French physicist Alexandre Dauvillier (1882–1979) published his book *La Poussière Cosmique* in France, which appeared in English in 1963 as *Cosmic Dust*. This was certainly one of the first full-length books, and possibly the only one at that date, to devote itself entirely to the subject of cosmic dust throughout outer space. In writing his book, Dauvillier (a distinguished physicist who had worked closely with Louis de Broglie, one of my scientific heroes) felt that he needed to keep explaining and almost apologising for the fact he was writing a book about something that not long before everyone was convinced did not exist.

Here are some of his remarks:

It was thought until recently that cosmic space was absolutely empty ([here](#)). At the beginning of the century [1900] it was still believed that interstellar space was completely empty and transparent. ([here](#)). Twenty years ago [in 1941], the space separating the galaxies was also considered as a complete void, ([here](#)). Ten years ago [in 1951] intergalactic space was considered absolutely devoid of stellar or dispersed matter. The work of F. Zwicky with the large telescope of Mount Palomar showed that intergalactic space is not absolutely empty' ([here](#))

Unknown until now, there were two other scientists who clearly realized even before Fritz Zwicky did that outer space was not an empty vacuum. This information has come to light very recently from the archives of Sir Fred Hoyle (1915–2001), which have been deposited at St Johns College in Cambridge. Chandra Wickramasinghe, Fred Hoyle's former student and his closest collaborator in his later years, has been going through the unpublished portions of Fred Hoyle's autobiography. I thank Chandra for sharing with me some sections of this material that provide this unique information. And I am grateful to the Estate of Fred Hoyle for permitting their use.

We learn from these unpublished portions that Fred Hoyle and his friend and scientific colleague Ray Lyttleton (1911–1995) had together decided by

1940 that outer space was not an empty vacuum, but was full of ‘gas’, by which presumably Fred means ionized gas that we now call plasma. However, they went much further than that. What follows are quotes from papers originally written for a book that would be published in 1994.

[In] 1940 Ray Lyttleton and I suggested that the gas between the stars was likely in places to be clumped into much denser clouds than astronomers were then prepared to admit. We also suggested that the gas in dense clouds would be molecular rather than atomic, with molecular hydrogen the dominant component. These perfectly correct predictions never did us much good, however, because they were thought outlandish in their own time and three decades later, when observation had shown them to be correct, nobody remembered what had been said as long ago as 1940. So it goes, I’m afraid.

The thought that molecules, even quite complex molecules, might be present in great quantities within dense clouds of interstellar gas never died away in my mind, although astronomical opinion through the 1950s was so firmly set against the idea that to argue for it in the scientific literature became impossible. Throughout my career I have argued fiercely against the refereeing system practised by nearly all the so-called serious journals. My opinions are admittedly coloured by an intense dislike of being told by referees what I may publish, or not publish. But this is not the whole story. The superficially plausible reasons for maintaining the system are false. The real reason for the existence of the refereeing system is that it provides the majority with a strictly applied censorship over ideas which it does not wish to hear.

Because in the 1950s the seemingly respectable vehicles of publication were closed to the concept of molecules in space, I turned to the disreputable vehicle of science fiction. My novel *The Black Cloud* was written in an irascible mood immediately following an international meeting of astronomers. The novel had the effect in my mind of connecting molecules in space with life, although by imagining a life-form very different from terrestrial forms, I was unfortunately off on the wrong track.

Fred was not necessarily off track after all, as he realized much later. The sad story of Hoyle and Lyttleton being unable to publish their views echoes the troubles of Fritz Zwicky in the 1940s.

We will return to Fred Hoyle and his contribution to this story in Chapter 11.

However, for all the importance of the work of Zwicky, Hoyle and others, the scientist who probably did most to throw light on ‘invisible matter’ in space and to prove that space is not empty was Birkeland’s fellow Scandinavian, Hannes Alfvén (1908–1995).

The Birkeland Currents were given this name in 1967 in honour of their discoverer, and called then by that name in Alfvén’s article ‘On the Importance of Electric Fields in the Magnetosphere and Interplanetary Space’, which he published in that year.

Alfvén's breakthrough was to follow up Birkeland's speculations by identifying plasma as the medium by which electric currents could travel through space, as he extrapolated what he discovered about the currents running between the Sun and the Earth first to the galaxy and then to whole of the Universe. This breakthrough would lead to both a radical new understanding of the contents of the cosmos and also by coming to an understanding of the mechanisms by which plasma carried the currents and in turn the effects of currents of plasma a greater understanding of plasma and its extraordinary properties. By studying Alfvén and his followers, and their discoveries, we can begin to see how plasma in general and the Birkeland Currents in particular are fundamental to the way the Universe works.

Because Alfvén showed that the Universe has this vast network of plasma filaments carrying electric currents, he also showed that the Universe is full of electromagnetic fields. In fact, Alfvén's electric currents in space produce a complex and dynamic interaction of magnetic fields, magnetic currents and electric fields throughout space. The charging of particles in plasmas and space by electromagnetic fields in turn modifies the electromagnetic fields. Whereas once space was thought of as empty, we now know that at a subatomic and quantum level, space is a jungle of plasma, a highly charged, creative ecosystem with matter in the form of particles being one of the things it creates.

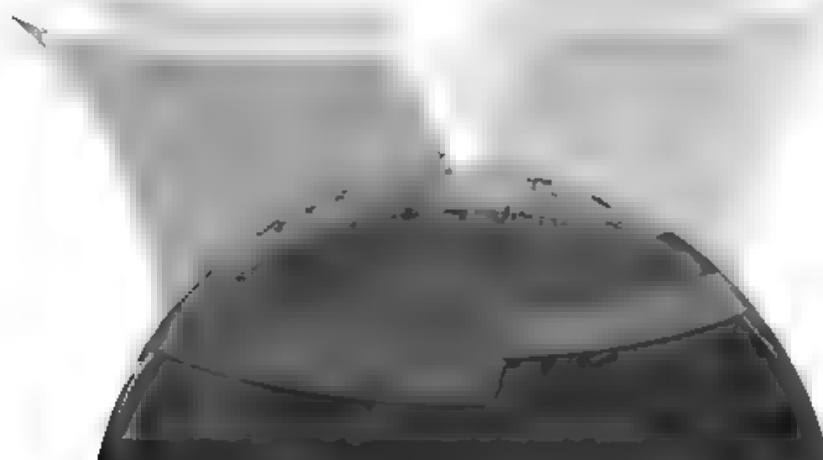


Figure 15 Upward and downward current sheets of flat electric current extending between the Earth and space, discovered in 2017. The pale current sheets show the descent onto the planet of charged particles and the dark sheets show the upwards ascent of charged particles (as indicated by the small arrows). However, it has been well known for many decades that negative current pours into the pole in a stream. It is unclear why this is not also shown, nor is it clear why the current is rising from two opposite quarters of a ring current, how that is happening (what makes it rise?), and what charge these sheets have. (The same? Opposite?) Much more clarity is needed before we can simply accept this picture, which must only be part of a much larger process which is going on and which requires much more investigation. (Image courtesy of European Space Agency)

Alfvén showed that a Birkeland Current is a stream of either negatively charged particles (electrons) or positively charged particles (protons and positive ions) that can travel for immense distances through space (many millions of miles or even billions of miles at speeds not far below the speed of light) along a ‘twisted rope’ not made of dense matter at all. The ‘rope’ is made entirely of the charged particles themselves and the magnetic fields generated by those streams of current. Scientists call these ropes ‘filaments’. When there are several of them seen at once, they are referred to as a filamentary structure. Sometimes they consist of substantial bundles of filaments, and sometimes of only two, which are literally a ‘double helix’.<sup>1</sup>

Superconductivity is an extraordinary phenomenon, first observed in 1911, by which a current can pass through certain materials and experience zero resistance. Classical physics cannot explain how this works and the quantum mechanical explanation is still not complete. But in 1970, Laszlo Solymar and Donald Walsh, two particularly brilliant scientists, clarified the nature of superconductivity to a large degree by pointing out that superconductive filamentary currents consist of a central magnetic field surrounded by whirling layers of current vortices. They specifically stated: ‘Thus, in a simplified manner, we may say that there is a normal region surrounded by a supercurrent vortex. There are lots of [layers of such] vortices . . .’ (Laszlo Solymar and Donald Walsh, quoted in Laszlo Solymar, *Superconductive Tunneling and Applications*, Wiley-Interscience, New York, 1972.)

The illustration overleaf of a cross-section of a Birkeland Current shows such layers.

Birkeland Currents are far more efficient at conducting current than any dense matter conductor could ever possibly be, and they have very little

current loss despite the fact that they can extend not only across our solar system but across our entire galaxy, and even beyond. Indeed, galaxies themselves seem to be linked by Birkeland Currents. There are many photographs of Birkeland Currents in space, and there are many on the internet and in books to which I shall refer in a moment

The 'loops' that are seen extending upwards and outwards from the Sun's surface and from the solar corona (which is far above the surface) are also Birkeland Currents. They are sometimes called 'magnetic field lines' by astrophysicists, which is incorrect; they are actually the glowing traces of the charged currents themselves, and there are many photos of these currents taken from the International Space Station, which show a kind of eerie glowing green river running along beside the space station, and encircling the Earth

The charged particles that reach the Earth from the Sun are mostly positively charged, made of protons and ions emitted by the Sun, and they stream along Birkeland Currents towards the north and south poles of our planet. They are literally space rivers of positive current streaming into our planet, and into all other planets in our solar system as well. What this means is that there are 'threads' connecting the Sun with all of the planets, which is thus in continuous direct communication with all the 'small fry' by means of these rivulets. Of course, the rivulets get all twisted up because of the revolutions of the planets, and sometimes the rivulets are shut off and then new ones start up again.



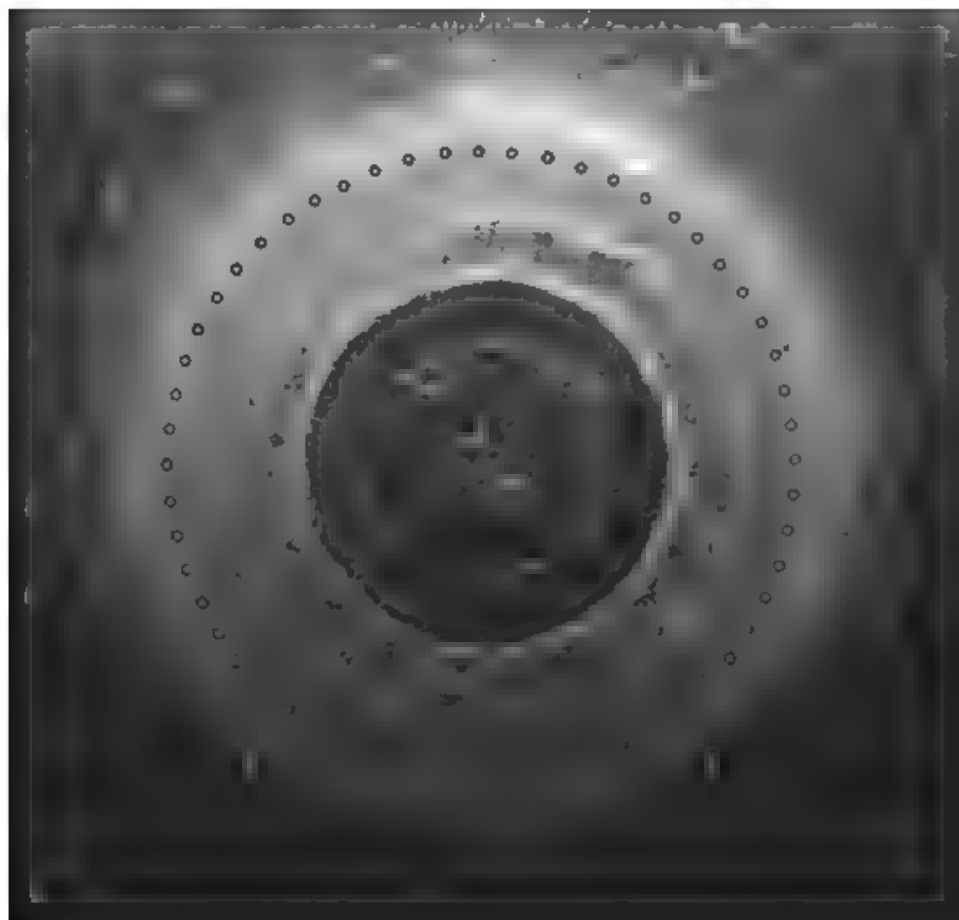


Figure 16 Cross-section of a dense plasma Birkeland Current captured on a photographic 'witness' plate in a plasma lab in 2007. The circle of dots is overlaid onto the image to indicate the 56 locations of the apparent spiral-shaped paths of matter. (Image supplied courtesy of Anthony Peratt, reproduced from Donald E. Scott's seminal paper, 'Birkeland Currents: A Force-Free Field-Aligned Model', in *Progress in Physics*, Vol. 11, Issue 2, April 2015, pp. 167-179.) The spiralling currents counter-flow, in other words, one ring flows left and the next flows right, etc., and the whole thing is spiralling forward (towards you, looking at the page) at great speed in a cylindrical 'skin' known as a 'double-layer sheath'.

Birkeland Currents beneath the surface of our own Sun are known to be 40,000 miles wide, as mentioned earlier. The ones linking stars are far larger, and ones linking galaxies in filaments to form 'the cosmic web' of the Universe are so gigantic that they are much wider than the diameter of any sun or star. Many have been observed and recorded by astronomers, including the Sloan Great Wall—a filament that is an amazing 1.37 billion light years long.

Birkeland Currents can also be microscopic. Our bodies are full of them. It is because of the nature of such infinitesimally small currents that we are

alive, as we will see in the final chapter

The way in which the 'ropes twist' to form Birkeland Currents in a double-helix shape is really rather astounding. Does this remind you of anything? Yes, there is a distinct similarity between the structure of the DNA molecule and a Birkeland Current. Not only is this, in my opinion, no coincidence, but we shall see that since the 1970s there have been cell biologists insisting that charged currents flow along the DNA molecules inside our bodies, and that they are superconducting. Double helixes not only carry currents, they transmit information. All of this is getting us closer and closer to what I believe to be the nature and structure of a plasma body, and to the reasons for believing that intelligence can evolve in plasma.

But first we must return to look in more detail at the way Birkeland Currents function in space. We will see the current standard understanding of electricity and magnetism is still insufficiently developed for us to 'get our heads around it all'.

As one example of our failure to comprehend the great mysteries that surround us, I come to what we call magnetic lines of force, or magnetic field lines. These are constantly spoken of by scientists around the world, as if they really existed. But they do not exist.

Just in case you think I am being fanciful, here is what John P. Cullerne and Anton Machacek say in their physics textbook, *The Language of Physics: A Foundation for University Study*:

'... field lines are a fictitious pictorial representation of a field.'<sup>2</sup>

Field lines are used in the way that contour lines we draw on maps are used. The real landscape is not covered in contour lines. When we climb a hill, we do not say: 'Oh, I just stepped over a contour line.' Similarly, magnetic field lines are merely aids to visualization, and they are not real.

So where does this leave us? Didn't I say that Birkeland Currents 'follow magnetic field lines'? Well yes, I was using a figure of speech.

Now let us examine a bit more closely how a Birkeland Current is formed, and how it works. It all starts with a 'push' of currents of electrically charged particles emanating from a source

The push forward of the current is facilitated by what we call an electric field.

At this point, I should pause to admit that although scientific talk on these matters is confident and well-established by custom, it is often hemmed in by ignorance. For example, we don't really know what fields are, but we talk about them nevertheless, until we find some other way of discussing them. I tend to believe that electric fields are spiral waves. So we have charged particles called electrons (assuming it is a negatively charged electric current, rather than a positively charged one consisting of protons and ions) spiralling along, pushed by something we call 'an electric field', though we don't know what that is, or what charge is either

But to return to the questions of how a Birkeland Current is formed, we do know that electric fields are always perpendicular to magnetic fields. These currents flow as if along 'magnetic field lines', meaning they follow a direction laid out for them by a large pre-existing magnetic field

As the currents move on their merry way, each creates a private magnetic field (known as an 'azimuthal' field) around itself in a circular fashion, which is thus at right angles to the electric field, but parallel to the larger magnetic field within which these tinier ones appear.

In Figure 17, we see a drawing published by Willard Bennett from his book *Fundamental Principles of Physics*, written jointly with his colleague Herman Heil, showing a section view of a normal copper wire carrying electricity. Remember that this picture is a slice across the wire and its surrounding field, and that the wire is coming straight at you. The black dot in the centre is the wire and all the circles round it are the 'lines of force'. Bennett describes the convention ('the usual agreement', as he calls it) whereby:

The lines in this figure are drawn nearer each other for positions close to the wire than for positions farther out, which is in accord with the usual agreement to represent field intensity by the number of lines per square centimetre in areas perpendicular to the lines of force.

And the drawing is, he says, to illustrate the fact that 'the magnetic lines of force are circular about the axis of the wire'. In other words, scientists have agreed a convention whereby the fictitious lines are drawn closer together to represent increased field strength, and further apart to represent declining or weaker field strength. There are no real lines, but there is assumed to be a

real field, just as on a contour map, there are real hills represented, but their contour lines are fictitious indicators of height and may be bunched closer together to indicate a steep incline.

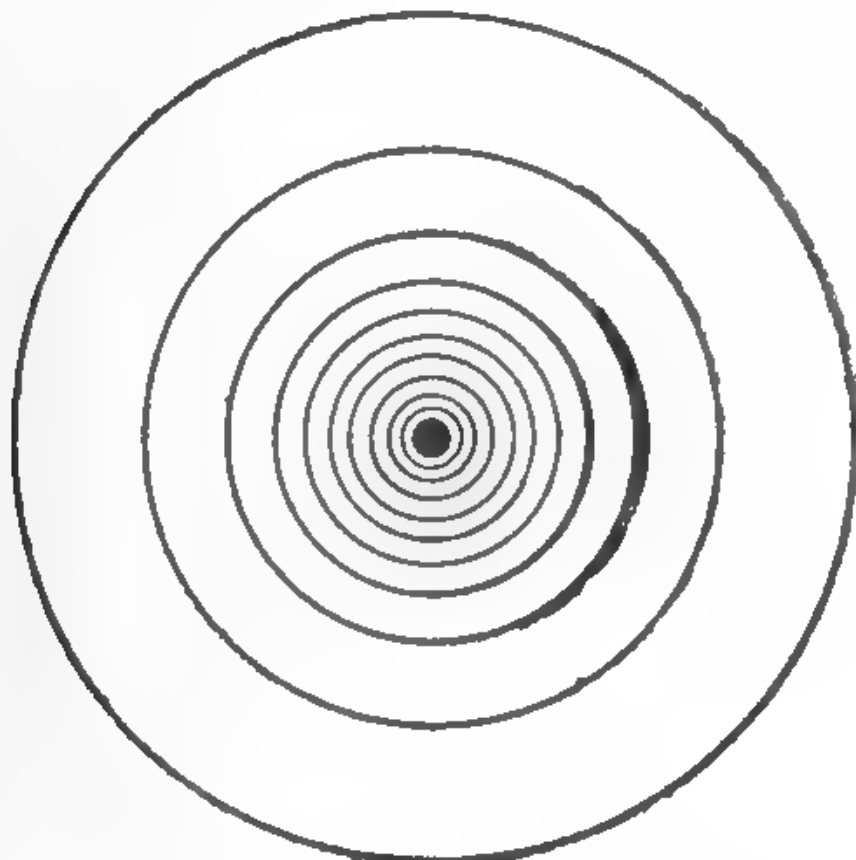


Figure 17 Willard Bennett's drawing. The fictitious 'lines of force' are drawn closer together the nearer they are to the wire (the black dot in the centre) to indicate increasing field strength. This is a section drawing, and the wire is coming straight at you in this picture

With regard to electric currents, the self-generated mini-magnetic field of each current then constricts that current, as if it were choking it.

The first person to observe that magnetic fields at right angles to electric currents displaced the current and caused it to deviate in its course by a certain angle was Edwin Hall (1855-1938). He made this discovery in 1879, and it is named the Hall Effect, in his honour.<sup>3</sup>

What happens with Birkeland Currents surely is a kind of extension of this phenomenon of the Hall Effect causing a slight deflection of angle. But obviously we need to do a lot more work on this issue, and part of what

needs to be done is to understand better the double-helix phenomenon of the Birkeland Current, as I shall now very briefly explain

The magnetic currents applied at right angles to Birkeland Currents have the result that two currents running parallel to each other start wrapping themselves around each other in a kind of perpetual lovers' embrace. As we have seen, they twist up into a double helix and flow on like twisted ropes. Their two surrounding magnetic fields join and become stronger as a result. This constricts and compresses the plasma of the double helix further, and at occasional points nodes (special compressed points, like knots) are formed by this inward pressure, called 'Z-pinches'. (In fact, having been discovered and explained in 1933, and published in 1934, by Willard Harrison Bennett (1903-1987), certain types of the plasma pinches known as Z-pinches are now generally called 'Bennett Pinches')

Plasmoids (plasma blobs) form at these points and begin to spin, thus attracting surrounding particles and matter in space to themselves and forming clumps. These are essentially energy whirlpools or vortices. The current flowing through the Birkeland Currents then continues to supply energy, what is called 'becoming a maintenance current', supplying energy to the spinning plasmoid, which goes on expanding. It was suggested originally by Alfvén that by this means, gigantic Birkeland Currents streaming through space form stars, and continue to pump them full of electrons. The 'pinches' can also create atomic matter, X-rays, and vast quantities of neutrons (large particles with no charge, called neutrons because they are electrically neutral), in a portion of the pinch known as the 'sausage instability'.

At the Z-pinch points where matter gets sucked towards the streaming currents, a process called 'Marklund Convection' takes place. This is named after the Swedish plasma scientist Göran T. Marklund. The matter settles into layers, with the lighter elements wrapped around the inner part of the cylindrical current, and heavier elements forming progressive layers outwards. The different elements are thus separated spatially, and available for the formation of solid bodies in space in separate 'bundles', as it were.

A theory of 'the electric universe' has grown out of Alfvén's work; it states that our Sun has electrons streaming into its poles from galactic Birkeland Currents, and protons and positive ions then burst out of the Sun to form the solar wind.

According to this theory, our Sun is powered by streams of electric currents from a filamentary web of gigantic current streams linking all the stars in the galaxy.

On this view, Birkeland Currents supply huge currents of electric power and they are surging round the Universe in filaments. The filaments that fill the visible Universe are so obvious when seen through powerful telescopes, they have led to a widespread acceptance amongst astronomers of the idea that the Universe is a Cosmic Web.

The best practical reference source to turn to for a description of Birkeland Currents in astrophysics is Anthony Peratt's book *Physics of the Plasma Universe*, which appeared in a much-revised and updated second edition in 2015. Peratt was a pupil of Alfvén's, and he is the world's leading proponent of and expert on the 'electric universe' theory. As previously mentioned, he is a very high-profile scientist associated with American Government agencies. For several years he was Scientific Advisor to the US Department of Energy, and he has been the Acting Director, National Security, Nuclear Non-Proliferation Directorate. He has worked at Los Alamos on nuclear tests, and is internationally renowned for his plasma research, and Hannes Alfvén was his PhD supervisor.

Here is what Peratt has to say about the electric power filaments that I have just described:

The high conductivity of cosmic plasma permits electric currents to flow that constrict the plasma to filaments. These current-carrying filaments form transmission lines, which allow electric energy to be transported over large distances. Transmission lines consist of an assemblage of two or more conducting paths. Transmission lines on earth, used for communications and the transport of electric energy, employ conductors that are usually arranged parallel to a common axis [i.e., side by side]. This need not be the case in space and is often not the case in filamentary current-conducting plasma in pulsed-power generators.<sup>4</sup>

Figure 18 is an image showing the filamentary structure of the Universe above and the filamentary structure of a neural network below. We will see later in the book that a similar web exists in our bodies, more particularly in what we might call our 'plasma bodies'.

We will see that not only can we be confident that all dusty complex bodies such as the Kordylewski Clouds are filled like this with a web of filaments, we can also be confident that our bodies are too. The filaments meet and connect at intersection points, which scientists call *nodes*. In

interstellar space these are stars. In intergalactic space they are galaxies. But at whatever scale, the pattern of a filamentary web keeps recurring.

Alfvén was, of course, the leading disciple of Kristian Birkeland. He and Peratt have carried forward Birkeland's ideas about Birkeland Currents. If Peratt's book is the ultimate 'bible' for this subject, Alfvén's book *Cosmic Plasma* (1981) is also fundamental. Alfvén and Peratt in turn have a disciple named Donald Scott, author of the book *The Electric Sky*. Scott is a retired Professor of Electrical Engineering living in America. My wife Olivia and I have been very pleased to get to know him and his wife Annis, and for me to have the privilege of speaking at the same conference with him on one occasion on the subject of the electric universe.

As for Birkeland, he was ridiculed in his lifetime for his theories about the aurora and was only proved correct in the 1960s when satellite data became available to us. Professor Alfvén was also ridiculed for supporting the theories of Birkeland, which he did from the 1930s onwards. But he too was finally vindicated, and was fortunate enough to live sufficiently long for this to happen in his lifetime, unlike poor Birkeland, who died prematurely. Alfvén Waves are named after him, and if something is named after you, things are certainly looking up.

Time and again in history, science seems only to progress via vicious ridicule, followed by vindication and reluctant, hypocritical acceptance by most of the people who have spent years insulting the innovative thinkers. Kristian Birkeland and those who have followed in promoting his idea of electric currents streaming through space, have defied orthodoxy and ridicule and have put forward a far more convincing explanation of how the Universe works. I certainly believe them to be correct.

The 99.9 per cent of the Universe that is plasma is not sitting there inert. It is fantastically active and dynamic.

And we shall shortly see that as plasma beings, we are part of that universal process.

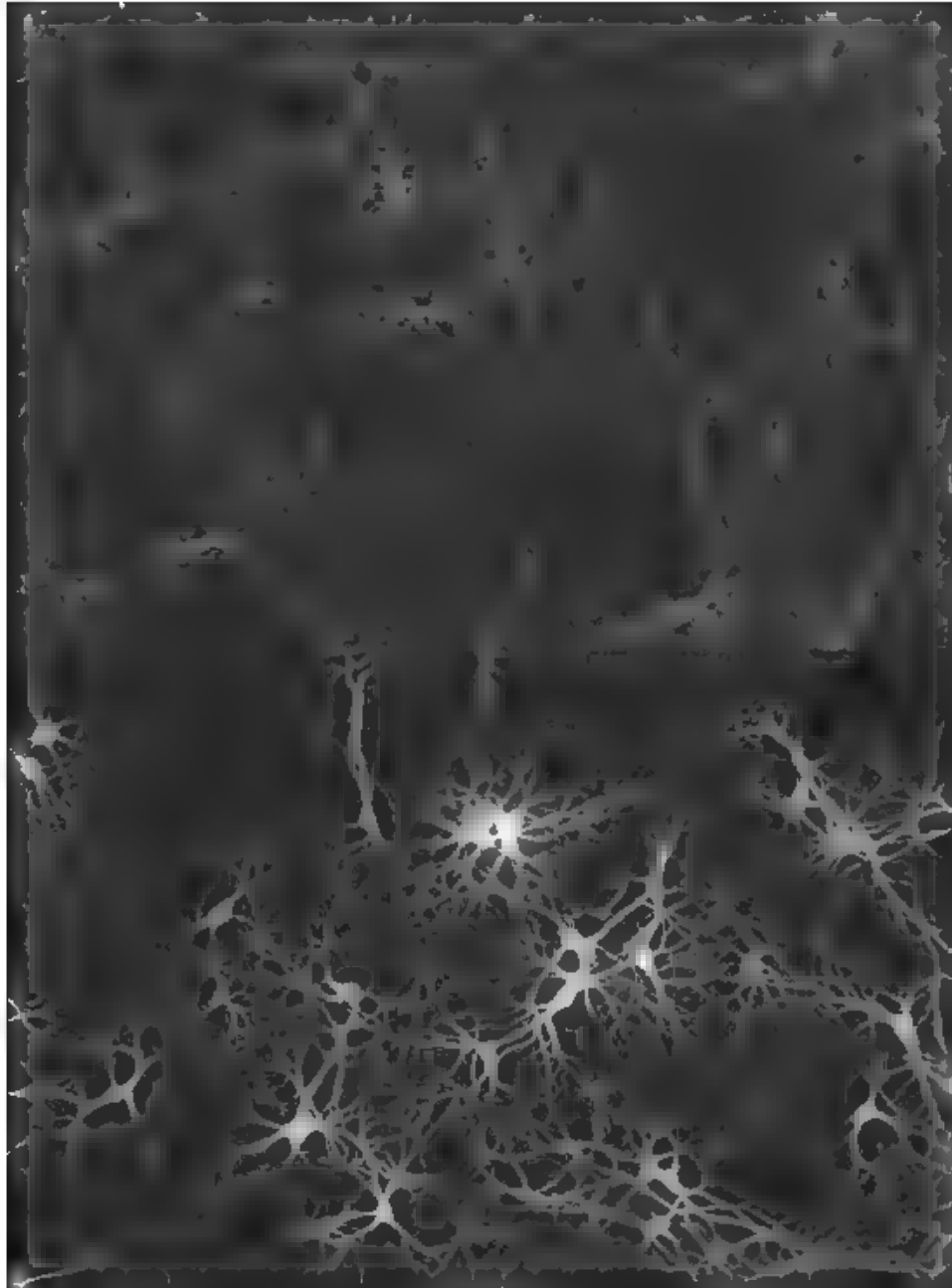


Figure 18 Filaments are fundamental to the Universe, and to all entities. They carry current. And they can carry information in the form of signals, they can transport energy, and so forth. In the Universe as a whole, they are everywhere. They constitute the major portion of the Universe's structure, which today is known as the Cosmic Web. Here we see two similar adjoining images. The top one shows the Cosmic Web of the Universe. The bottom one shows the neural network of the human brain. Both are constituted of masses of filaments separated by voids and joined at intersection points called nodes. The Cosmic Web is called that because of the web-like nature of the filaments, which many believe to be filamentary channels for the conduction of energy and currents across astronomical distances. Some scientists call them Birkeland Currents (named after the Norwegian scientist Kristian Birkeland), which contain current-carrying double-helices spiralling forward and surrounded by protective sheaths. Such spiralling currents are sometimes conceived of



as 'super-conducting', meaning that they can travel without resistance at speeds approaching the speed of light. The upper image was posted on [www.researchgate.net](http://www.researchgate.net) by astronomer Professor Oliver Hahn of the Lagrange Laboratory, Côte d'Azur Observatory, Nice, France, on December, 2014, as Figure 1 on page 2 of his paper 'Collisionless Dynamics and the Cosmic Web', from the *Proceedings of the International Astronomical Union*. (His paper with the image is available for free public download. Hahn does not himself discuss super-conducting currents or use the term Birkeland Currents.) The bottom image is credited to Matt Lee and was posted by eLife Science Digests ([www.eelifesciences.org/digests/37935](http://www.eelifesciences.org/digests/37935)) in an article entitled 'Traffic Signals That Wire the Brain', November 19, 2018. As with the Universe and its Cosmic Web, the Brain Web of a human being displays filamentary networks separated by voids and joined at nodes. Is the Universe a giant brain? Is the human brain a mini-Universe? In any case, these phenomena are examples of 'fractality' (a term arising from the study of fractal geometry), which means similar patterns and structures occurring at different scales, from the microscopic to the cosmic. Such reoccurrences of shapes are often referred to as the 'self-similarity' of forms which remain the same across different scales. These concepts arise from the pioneering genius Benoit Mandelbrot (1924–2010), discoverer of fractals. I was so fortunate to meet this heroic scientist on one occasion and attend one of his lectures. There are many videos of him on YouTube, which I enthusiastically recommend to all who wish to have their brains constructively stretched.

## *The Cold Sun*

We have all been told for our entire lives that the Sun is a raging furnace blasting out heat and light, which keep us alive here on Earth. The Sun is supposedly so hot that nothing one can imagine could survive for even a fraction of an instant without being melted and consumed and annihilated within its inferno. The Sun is inconceivably hot, inconceivably violent, inconceivably turbulent. It is like a great bully in the sky, roaring with rage and spewing out fire and rays.

But this is not true. And nobody could be more shocked than I was when I discovered this. It had made sense to me, having no specialist knowledge of all the other aspects of the matter, that the Sun must be the roaring inferno that was so widely claimed. And when I was told that it was powered at its core by the equivalent of an internal hydrogen bomb of fantastic and gigantic size, which generated all of its immense energy by the power of thermonuclear fusion and kept us all alive, I saw nothing to question in that. After all, where else could all that energy possibly be coming from? It must be true.

But then the conventional idea of the Sun began to fall apart for me, as I discovered some very strange facts in recent years. The ultimate discovery I made, which convinced me that 'nearly everybody is wrong about the Sun', was the revelation that the Sun is cold.

How can that be? Surely the Sun cannot be cold. You can see through telescopes that it is a turbulent mass of fire, spewing out blobs of fire into space, and it looks like a vast fiery creature gone mad.

But no. That is not accurate.

In fact, the 'surface' of the Sun, the technical name for which is the photosphere, is only about 5500 degrees Centigrade <sup>1</sup> (That is 5780 degrees

Kelvin, but I shall not use the Kelvin temperature scale in this book, because it is less familiar to readers ) Yes, that is hot for us humans We would be burnt to a crisp in an instant if we were there. But it is not truly hot. It is less than four times as hot as the inside of a cement kiln here on Earth, in which limestone is roasted to make cement. And it is only about a third as hot as the electrons in a neon light bulb in an office

Furthermore, it gets worse If you go down into a sunspot, which is like a gigantic wobbling open mouth on the surface of the Sun leading down inside to unknown depths, our observational instruments have proved from a distance that the temperature drops to as low as 3900 degrees Centigrade

What? You mean the Sun gets colder the further you go down into it instead of hotter?! How is this possible if it has got a big hydrogen bomb exploding continually at its centre? Well, the answer is that it does not have a big hydrogen bomb exploding at its centre.

The real heat of the Sun is found far above its surface, in what is called the corona. There the lowest temperature is two million degrees Centigrade, and it is believed that coronal temperatures can actually rise to several million degrees Centigrade. No one is sure of the upper limit, though four million degrees are often mentioned, and sometimes six million But even the lowest temperature (two million degrees) of the corona is 350 times as hot as the surface of the Sun, despite the fact that it is so very far away

Its lower limit is 1300 miles above the surface of the Sun It extends from 1300 miles above the photosphere to the further reaches of the solar system. The Earth is actually within the Sun's corona, technically speaking. But the main part of the corona from the point of view of solar physics surrounds the Sun in a vast sphere of fire, which reaches several million degrees Centigrade, as already described

If you were to travel towards the Sun (being miraculously immune to melting), you would pass through the genuine raging inferno of the corona, then you would travel sixty miles from a transition region until you reach a layer 1050 miles thick called the chromosphere, where the temperature would be a much lower 35,000 degrees, and finally after falling a further 250 miles, you would arrive at the photosphere, which I have already mentioned

The photosphere is not solid, so you could not stand on it. But it looks like a surface from a distance, and so that is why it is called 'the surface of

the Sun'. And then you could make your way down inside the tube of a sunspot, with the temperature continuing to drop considerably, until you passed out of sight and after that we have no idea of what you might encounter. But the point to remember about this journey is that it keeps getting colder the closer you get to the Sun.

So clearly our conventional ideas about the Sun cannot possibly be correct

The fact that the Sun is so cold and that the temperature drops as you approach the Sun, from several million degrees to only 5500 degrees, should be conclusive proof that the Sun cannot possibly have an explosion going on inside. Water does not flow uphill. Everyone knows that as you approach a hot stove, you do not get colder, you get warmer. But so deeply wedded are the majority of astrophysicists to their false theory of a thermonuclear explosion going on at the centre of the Sun, a theory originated by Sir Arthur Eddington (1882-1944), that they remain blind to the obvious.

Another point to keep in mind is why are those holes in the surface of the Sun known as sunspots not only colder than the surface, but also dark? Surely if the solar bomb theory were true, any holes in the photosphere would be blazing with light? But dark? So there we have it, the only sure indication of what lies beneath the solar surface is that it is cold and dark. This is far from the 15 million degrees of heat and explosion of light that the solar bomb theorists insist upon as being found at the core of the Sun, where their purported bomb is said to be going off.

Before returning to the question of how the Sun must really be powered, we need to learn a little bit about the 'solar wind'

### *The solar wind*

As we learned in Chapter 8, the expulsion of solar material into supposedly 'empty' space was discovered in 1936 by the French astronomer Lucien Henri d'Azambuja. Until then, 'outer space' had been assumed to be totally empty, consisting of a perfect vacuum, with the exception of the solid orbiting bodies such as planets, moons, asteroids, etc., within the solar system and stars outside it. In other words, no medium was recognized

However, we now understand that the solar wind consists of plasma together with admixtures of some atoms and a lot of dust, either negatively charged (by electrons) or positively charged (by protons and positive ions). Thus solar wind comes from the Sun and picks up dust on the way, although it has now been proved that plasma creates dust (as described earlier; see Chapter 3), so that some of the dust in the solar wind is thus plasma-originated.

In other words, the Sun is emitting in all directions a powerful 'wind' of plasma, which fills the entire solar system. It flows over the Earth constantly, blowing against and around the globe, being diverted in large part by the surrounding Van Allen Belts, or magnetosphere (see [Chapter 4](#)). But how long has this been going on? Has the Sun always been doing this, or is it something new? And could it ever end?

In 1977, Arthur J. Hundhausen, who was later to go on to become probably America's leading solar wind expert, published a summary paper entitled 'Plasma Flow from the Sun'.<sup>2</sup> By that time, there had already been fourteen years of satellite data, so that he was able to make reliable statements about the solar wind. He said that the evidence indicated that the solar wind had been blowing continuously for four billion years. That is a lot of wind, a long time span, and a very powerful Sun, with no end in sight!

In May of 1999, a very strange thing happened. For two days, the solar wind stopped completely. That certainly poses some problems for conventional ideas about the Sun. Did somebody turn off the central bomb? How can you turn off a thermonuclear explosion and then start it up again two days later?

The 'orthodox' view of the Sun at the moment is, as I say, that the thermonuclear explosion taking place at the core of the Sun powers everything. However, solar scientists admit that if the heat and energy from that explosion are to reach the surface of the Sun, by what they call convection, the process of the energy rising to the surface from the core could take 200,000 years. According to the Establishment theory, therefore, we are currently being warmed by radiation emanating from an explosion that took place 200,000 years ago. The results of today's core explosion will be felt on Earth in the year 202,017.

There are many bizarre solar anomalies that are ignored and glossed over at the moment. For instance, every 2 minutes and 40 seconds, the Sun shrinks in size and re-expands, or in other words rises and falls, by six miles. That's a long way to fall and a fast rise! There is no 'orthodox' explanation for this strange fact. Is the Sun breathing? If there were continual pressure from a thermonuclear explosion at the core of the Sun, how could that pressure 'breathe' every two minutes and 40 seconds? Are we to imagine a fusion process that has lungs?

The solar wind is mostly positive in its charge. Positively charged protons and ions spew out of the Sun continuously except for these short breaks. It seems that if it sheds too many positively charged protons and ions, it stops for a few minutes until it 'recharges', and then starts up again. As we saw in Chapter 8, huge streams of electrons pour into the polar regions of the Sun continuously from immensely long galactic Birkeland currents. This continual inflow of negatively charged electrons provides the pressure to expel the oppositely charged positive ions into space, which form the solar wind. This system of solar activity is described in 'the electric sun' theory. It provides a way for the Sun to operate for billions of years without the need for any central explosion at all.

Although some atoms are known to be created by the Sun, they are created under the intense temperatures of the corona, far above the main body. In other words, the temperatures needed to create the higher chemical elements are outside of the Sun's core body and take place in what is effectively its outer skin. This is like trees, the centres of whose trunks are essentially unproductive and simply inert wood, whereas the true life processes of the tree trunk take place in its bark.

Another major problem for the 'thermonuclear folks' who refuse to give up their hydrogen bomb in the centre of the Sun is what is known as 'the neutrino question'. It is admitted by everyone that there should be a very large number of the tiny nuclear particles known as neutrinos pouring out of the Sun as a result of any thermonuclear explosion. But the requisite number of neutrinos has never been detected. This embarrassing lack of neutrinos is often a source of public anguish to many in the 'astrophysical community'.

In the next chapter we shall look at more scientific discoveries, which show the Earth's relationship with the Sun to be very different from what

we generally assume it to be.

*Invisible Earth*

There is an Earth that is invisible to the human eye, and it surrounds the visible planet Earth. This other Earth is composed of plasma, and it is far larger than the 'solid core' on which we live. Which, then, is the real Earth? Or is the real Earth both together? The Invisible Earth was only discovered in 1958 thanks to satellite data by James Van Allen (1914–2006).

When James Van Allen's portrait appeared on the cover of America's *Time* magazine on 4 May 1959, with the news banner 'Space and the Radiation Belt' angled across the top, he became an instant American hero. He had discovered something called 'radiation belts' surrounding the Earth. Few people until then had any inkling that the Earth was protected from the solar wind by these shields, or 'belts', surrounding it. But then, prior to 1953, neither had any scientists. As for *Time*, the following year they did indeed name him America's 'Man of the Year' for 1960, thus increasing his fame, in case there was anybody left who had not yet heard of him, which was doubtful.

Inside the magazine, *Time* helpfully provided graphics that both recounted the sequence of discoveries and showed the now famous 'belts'. This sequence of graphics was headed 'Space Detective Story', to help everybody realize that it was only slowly and painfully discovered by intensive research stemming from rocket and satellite launches. The graphic sequence was divided into four boxes. Box One said: '1953 Rockoons [small solid fuel sounding rockets fired in the atmosphere after becoming detached from a balloon, rather than fired from the ground] fired off Newfoundland detect first hint of radiation belt'. The picture showed a small red arrow pointing into space from Newfoundland in Canada. Box Two said: '1958 Explorers I and III find lower portion of inner belt'. The



picture shows the inner belt in cross-section above the Earth, and informs us that it is 2000 miles thick. Box Three says '1958 Project Argus demonstrates charged particles follow magnetic lines of force'

Project Argus involved exploding atomic bombs above the Earth, and the picture without the slightest embarrassment at this shows an exploding red star above the Earth labelled 'Atomic Explosions' and red lines showing the charged particles from those explosions circulating round the Earth, with the orbit of another satellite also indicated, which says, 'Explorer IV measures results'. And finally, Box Four says 'Dec. 1958 Pioneer III reaches 63,000 mi., establishes second radiation belt' and the picture shows this, labels it 'Outer Radiation Belt', indicates that it is 10,000 miles above the first belt, and there is a further arrow surrounded by dots that is called 'leakage of particles'.



Figure 19 *Time* magazine's explanatory chart by V Puglisi, of the discovery of the Van Allen Belts. The bottom picture shows how much bigger the Second ('Outer') Belt is than the First. A third higher Belt was discovered later. Note the shameless boasting about the 'Atomic Explosion' in the picture above the bottom one, complete with a helpful red explosion. How incredibly naïve, or should I say stupid, the military authorities were, and how idiotic the editors of *Time* must have been, to

print this without any indication that they had turned their brains on and realized that maybe this was possibly not such a good idea

Thus did the public get their necessary basic science lesson and see what it was that Van Allen had discovered. There was a lengthy article to explain it all much further, and to describe the man himself. The magazine informed everyone:

In the race into space, the Russians can claim bigger satellites and more powerful rockets. If the U S can retort that it has a big lead in scientific achievement, the man most responsible is James Van Allen, whose instruments, designed and largely constructed in his basement laboratory, brought back from space discoveries the Russians never made

But Van Allen never expected to find himself, at forty-four, a key figure in the Cold War's competition for prestige. He is and always had been, by inclination and intent, a 'pure' scientist. His real interest is in cosmic rays. He started being curious about cosmic rays back in the pre-war days when they were considered as wildly abstruse and impractical as a study of the mating habits of sea horses, or the inner structure of a grasshopper's brain. But today he can tip back his head and look at the sky. Beyond its outermost blue are the world-encompassing belts of fierce radiation that bear his name. No human name has ever been given to a more majestic feature of the planet Earth.

Readers were also reassured that Van Allen was 'about as American as a man can be'. He came from Iowa and his mother was raised on an Iowa farm, doubtless making apple pie from an early age. As for his Dutch surname, everyone was reassured that those Dutchmen on his father's side 'came to the US soon after the Revolution' and hence had been thoroughly imbued for two and a half centuries with the necessary American credentials and patriotism.

All of this publicity was carefully crafted as part of the Cold War PR battle between America and the Soviet Union. But it had a value as regards popular education in science, because you could only with difficulty find anyone in America after the spring of 1959 who had not heard that there were some kind of strange radiation belts surrounding the Earth, and that they were called Van Allen Belts because the American hero Van Allen had discovered them, from his basement, no less, and those irritating Russians had their noses out of joint as a result. 'They' may have had their Sputnik and Gagarin, but 'we' had Van Allen.

At least all this publicity taught the public something about what surrounds the Earth beyond the breathable atmosphere. Perhaps if there had been no Cold War and Van Allen had not been publicized so widely, the public would have remained ignorant of the Van Allen Belts for many

decades to come. Sometimes public education in science comes in strange ways!

In 1956, while Van Allen was still a lowly and unknown scientist ostensibly working quietly at the University of Iowa, he published a book entitled *Scientific Uses of Earth Satellites*. In fact, Van Allen was probably already working for the Electronics Program Office of the US Office of Naval Research, albeit usually physically present in Iowa. The Office of Naval Research is essentially one of the many American intelligence agencies, one that specializes in scientific research, and we will later come across it as the employer of Freeman Cope. The Army and the Air Force have their own equivalents, but the Naval one tends to have the highest reputation for high quality scientific work. All three of them could either operate independently or operate as 'covers' for the CIA.

It is very common for talented scientists spread across the universities of America to have their salaries paid ultimately by government intelligence agencies, sometimes not even the intelligence agencies whom they think are paying them, but instead by one hiding behind another, and the universities like this because they get high profile professors for free. The downside is that the Government 'owns' those men and women, who have to sign onerous contracts that give the agencies power to withhold publication of much of their most important work, and even to slap secrecy restrictions on what the scientists can say about it to friends and colleagues.

Since 1947, the US Government has had the power to declare any scientific work taking place in America 'secret' and restrict its publication on grounds of national security, and these restrictions do not have to be explained or justified. Everyone in the security world knows that there is a great deal of unnecessary 'overclassifying' going on, with material declared secret without any rational justification. But there is very little oversight for this process.

In other words, a very substantial proportion of America's ostensibly disparate scientific community really works secretly for the Government, or as conspiracy theorists like to say, 'for the CIA', using 'the CIA' to stand for the plethora of intelligence agencies including the Office of Naval Research (now apparently absorbed into DARPA or Defense Advanced Research Projects Agency), which are all lumped together for the sake of ordinary conversation as 'the CIA'. It is publicly admitted that there are at least

seventeen different intelligence agencies in America. Many are genuinely separate agencies, which exchange information with each other from time to time, and are theoretically coordinated today by a central body, the competence or incompetence of which is of course secret, even from the politicians, so who knows whether it all works seamlessly or not, and who will ever know.

In the Appendix 3, Bibliography for Van Allen ([here](#)), it may be seen that under the dates of 1979 and 1982 are listed articles by Van Allen that are stamped 'released for publication' by the US Department of Defense. In other words, just about everything Van Allen wrote could only be made public with the specific written permission of the Government. So we will never know how many of his studies remain secret, and there are bound to be many of them. In evaluating the work of Van Allen, we must always keep this in mind, that we know only part of the story and will never know the whole of it.

Some aspects of Van Allen's work are barely documented in archives open to the public at all. For instance, the fact that he was intensely active in trying to find out how to make better semiconductors is only revealed by the fact that his contribution to a 1961 conference on the ultra-purification of semiconductor materials was included in the Proceedings of the conference published by Macmillan as a scientific text in 1962. The reason why 'ultra-purification' is so important for semiconductors is that the purer the chips are (at that stage they would have been made of either silicon or germanium), the better the electrons flow in them, and the more efficient they are.

I have been in a chip factory and seen that the fanatical obsessions with purity and cleanliness are a commercial necessity. Everything takes place in 'clean rooms' into which one cannot enter, though you can see into them through windows from a corridor. The slightest speck of dust is enough to frighten everyone in the building. But people do not tend to know that Van Allen was involved in all of this. Instead, Van Allen will forever only be associated with scientific space exploration.

Since 1953, seven years before the article in *Time*, rocket launches had been detecting some anomalous radiation phenomena in the high atmosphere. But it was only in 1958 that satellites were launched, which instead of shooting up into the atmosphere and then quickly falling down

again, as rockets did, could continuously monitor the high regions for radiation. The very first such satellite, which was later publicly known as Explorer I, had initially been called simply Satellite 1958 $\alpha$ , identified by the year of launch and the Greek letter *alpha*, which being the first letter in the Greek alphabet signified that it was the first satellite launched that year. This satellite detected unmistakable signs that there was a belt of radiation surrounding the Earth. The second satellite, later known as Explorer II, did not search for such information. The third satellite, 1958 $\gamma$ , tagged with the Greek letter *gamma*, which is the third Greek letter, came to be known as Explorer III and it confirmed what Explorer I had found.

In his book of 1956 and in a five-page article of 1957, Van Allen had published accounts of what the earlier rockets had detected, which he still referred to as ‘auroral radiation’. By that he meant that he thought he had detected the source of the radiation that streams down and forms the Aurora Borealis, and perhaps also the polar ring current made mostly of protons and positively charged ions that circulates in the Earth’s magnetosphere far above the atmosphere.

After the Explorer satellite findings, still referring to them as Satellites 1958 Alpha and Gamma, Van Allen and his colleagues on his team (George Ludwig, Ernie Ray, and Carl McIlwain) published a series of three articles in 1958 reporting on the amazing discoveries of a radiation belt around the Earth. These findings entirely superseded the accounts published only the year before from rocket findings. After that, Van Allen switched to the *Journal of Geophysical Research* as the medium for announcing his further findings, and published numerous articles in that periodical of the American Geophysical Union in Washington. At the same time, he became a member of the Board of Editors of that journal, and an Associate Editor. Due to his official ties with the journal, it was clear that he owed that publication the loyalty of allowing it to be the chosen vehicle for reporting his findings.

The next thing that happened in 1958 was Project Argus (but to consult it on Wikipedia you must type in instead ‘Operation Argus’, since ‘Project Argus’ is a name today better known as one applied to a police operation). This involved sending three atomic bombs up into the high atmosphere and exploding them, as already mentioned. The first bomb was of 10 megatons and was detonated on 1 August 1958. This bizarre project is worthy of extended discussion, which unfortunately in this book would be too great a

digression. The bombs sent charged particles hurtling along magnetic field lines and the results were monitored by the satellite Explorer IV

This helped scientists understand the radiation belt better. Whether it was good for the Earth and its inhabitants seems not to have been considered! The motto of the people launching the rockets and satellites seems to have been a heedless 'when you gotta know, you gotta know', and the hell with what the consequences might be of blowing up all those atomic bombs above people's heads. The damage done to the atmosphere by this crazy and irresponsible project (one of the bombs was truly gigantic and incredibly dangerous), forms part of the sad history of mankind's progressive destruction of the ionosphere by military organizations, which I believe is the true cause of climate change, much more important than any carbon dioxide emissions

Van Allen's first article to appear in his newly affiliated journal was published in March of 1959 and was entitled 'Radiation Observations with Satellite 1958ε', the Greek letter *epsilon* signifying that year's fifth satellite. It was written jointly with his colleagues Carl Edwin McIlwain and George Ludwig. (McIlwain was a young researcher who had made one of the key observations.) Here are some of the remarks from that article that are of great historical importance and of deep interest:

The earlier discovery of the great radiation belt around the earth with Satellites 1958α and 1958γ has been confirmed and greatly extended with an apparatus of much greater dynamic range and discrimination. It appears likely that many important geophysical phenomena are intimately related to the reservoir of charged particles found to be trapped in the outer reaches of the earth's magnetic field. The existence of a high intensity of corpuscular radiation [radiation composed of particles] in the vicinity of the earth was discovered by apparatus carried by Satellite 1958α, launched at 03 48 on February 1, 1958

The data from 1958α and 1958γ showed that (a) The intensity of radiation up to some 700 km was in good accord with that to be expected for cosmic rays only. (b) Above some 1000 km (this transition altitude being longitude and latitude dependent) the intensity of radiation increased very rapidly with increasing altitude, in a way totally inconsistent with cosmic ray [rays coming from space] expectations. It was proposed in our May 1, 1958, report that the radiation was corpuscular in nature, was presumably trapped in *lunes* [arcs of three-dimensional space with thickness and shaped like crescents], about the earth, and was likely related to that responsible for aurorae.

On the basis of these tentative beliefs it was thought likely that the observed trapped radiation had originally come from the Sun in the form of ionized gas, which may or may not have been subject to acceleration in the outer reaches of the Earth's magnetic field. The existence of such radiation had been presaged by our earlier rocket observations. We are not at this date prepared to report a range spectrum of the radiation, nor are we able to offer a definitive

appraisal of the important matter of whether the more penetrating component consists of protons, of electrons, or of X rays

On the basis of the evidence presented above, we regard it as established that the great radiation belt around the earth consists of charged particles, temporarily trapped in the earth's magnetic field. The radiation belt may well be the seat of a distributed 'ring' current encircling the earth, and the perturbations of the belt due to arrival of solar plasma may be directly responsible for solar storms. No detailed study of this possibility has yet been made

What Van Allen had discovered was confirmation of the hypothesis put forward by Kristian Birkeland. Furthermore, without apparently fully realizing the significance of what he was saying, Van Allen said that maybe there was a 'ring current' around the Earth. This article therefore can be considered as the first appearance in print of physical confirmation of Birkeland Currents in space. But Van Allen and his colleagues were still struggling with the concept of plasma in space. They persisted in referring to what came from the Sun as a 'gas', albeit an ionized gas, which they hesitantly called a 'solar plasma'. But at this stage, no one yet understood the true nature of what we today refer to in common parlance as 'the solar wind', the massive streaming of plasma from the Sun outwards into the entire solar system, and bathing the Earth.

In December 1958, the satellite Pioneer III discovered the second radiation belt, high above the first and much larger. It was during this same year of 1958 that Eugene Newman Parker proposed the existence of what we now call 'the solar wind'.

During 1958, Van Allen approached the scientist Tommy Gold for advice on how to understand and interpret the satellite findings. In his article just quoted, Van Allen says: 'We are grateful to Professor T. Gold for an opportunity to discuss a number of matters of general physical interpretation . . .' As I mentioned earlier, Tommy Gold (1920–2004) and I were good friends towards the end of his life. It was in 1959 that Tommy coined the term 'magnetosphere' to describe the plasma regions above the Earth, including the newly discovered Van Allen belts. I believe it was Tommy who edged Van Allen and his colleagues away from the idea that what was coming from the Sun was simply ionized gas, and tried to get them to think of it as plasma, which as we now know is correct. He could see that the plasma consisted not primarily of atoms of gas, but instead of charged particles. Tommy thus did a lot to advance our understanding at this stage.<sup>1</sup>



In 2013, a temporary third Van Allen Belt was discovered by NASA, but it was subsequently destroyed by a shock wave from the Sun. Or so the story goes, though it may simply be a cover story to explain its destruction by human interference. The second and outer Van Allen Belt is now known to consist largely of electrons, whereas the inner and smaller one consists of a mixture of protons and electrons. It was only in 2014 that it was discovered that the inner edge of the outer Van Allen Belt is very sharp and highly defined, and resembles a protective barrier. Scientists are still trying to understand that discovery.

This finding is, however, precisely what one would expect, because plasma regions whether large or small are routinely surrounded by closely fitting plasma sheaths, which are rather thin, and their edges do tend to be very sharp and highly defined, as we now know is the outer Van Allen Belt. In other words, what continues to be discovered about the Van Allen Belts provides increasing evidence that they are standard plasma belts of the classic type. Our planet is thus the solid core of a vast plasma entity that surrounds it. We need to accept that the Van Allen Belts and the atmosphere are the Earth just as much as the solid core.

Our planet is more than solely a round ball in space. If we remember the fairy tale of the princess and the pea, we might compare the planet on whose surface we live to the pea under the mattress. All we have to do is bend the mattress into a sphere, suspend the pea in the middle, and presto, we have the Whole Earth. The fact that the mattress is invisible to our retinas, and we can see only the pea, is neither here nor there.

## *Radiant Matter, Plasma and Plasmoids*

For the last few chapters we have been considering the existence and flows of plasma in space and how these came to be recognized and understood. Now we turn from the cosmically large scale to the absolutely minuscule, and to the story of how plasma came to be discovered and explored within the laboratory.

Winston Harper Bostick is one of the great heroes of this history. He followed in the footsteps of Langmuir and Spitzer. He was a contemporary of Alfvén, and their work intertwined.

Bostick's great individual contribution was his discovery of plasmoids. Plasma is all around us, as we have seen, making up over 99 per cent of the Universe. A plasma is a distinct entity that has emerged from the great plasma soup, and a plasmoid is a type of plasma, which as we are about to see is often spherical or blob shaped, or sometimes shaped like a doughnut and it also has strange properties.

It is worthwhile recounting what happened in some detail, because what was discovered and the manner in which it was discovered reveal so much of importance. In the mid-1950s, the 39-year-old Bostick was working as a scientist in the brand-new Radiation Laboratory of the University of California at Livermore. It is today called the Lawrence Livermore National Laboratory.

The lab had been created in 1952 by Robert Oppenheimer's best friend E.O. (Ernest Orlando) Lawrence (1901–1958), who had won the Nobel Prize for Physics in 1939, and Edward Teller (1908–2003), who is often called 'the father of the hydrogen bomb'. It was created to supplement the US Government's nuclear warfare research at Los Alamos. The Livermore Lab continues to be entirely controlled by the US defence establishment and

proudly announces on its website today that for more than half a century it 'has applied cutting-edge science and technology to enhance national security'.

Bostick was asked to investigate the firing of plasma into magnetic fields, in order to see how the magnetic fields might become deformed, and to study the interactions between plasma and magnetism. In particular, he was to look for 'the manner in which magnetic-field lines can be dragged and twisted' (as he said in an article of 1938). This had many defence implications, especially relating to the hydrogen bomb, as well as being relevant to the potential control of nuclear fusion for purposes of producing energy, as nuclear fusion can theoretically be confined by magnetic fields. (Any solid material such as steel used in an attempt to confine super-hot plasma would simply melt.)

Bostick had assumed that he would be firing bursts of plasma at a magnetic field and that they would essentially be 'blobs of plasma', and that it was the magnetic fields and not the blobs that would be of interest. He was not at all prepared for what actually happened. If he had discovered something of lesser importance, it would probably have been swallowed up in the gigantic secrecy machine that eats most scientific research done for defence purposes in America. However, what Bostick found was of such earth-shaking importance that he had to be cleared to publish accounts of part of what he had discovered – because it was so game-changing in physics that worldwide debate was clearly going to be necessary to try to figure out what it all meant.

Funded by the US Atomic Energy Commission, Bostick had invented what is called a 'plasma gun', which he refers to more conservatively as 'a button source' (because the tip of the 'gun' was like a button), and he began using it to fire plasma into a magnetic field in his lab. And this was when the surprise discovery was made.

Eleven months later, Bostick's lengthy report, accompanied by many photographs, was published in *Physical Review*, under the title 'Experimental Study of Ionized Matter Projected across a Magnetic Field'.<sup>1</sup> In this article he announced:

the plasma is emitted not as an amorphous blob, but in the form of a torus [the geometrical term for a doughnut shape] We shall take the liberty of calling this toroidal structure a

plasmoid, a word which means plasma-magnetic entity

In a footnote at this point, Bostick was careful to give the credit to the Princeton physicist David Pines for coming up with the term 'plasmoid'. Bostick had originally thought of using the term 'plasmon', also a term coined earlier by Pines. But Pines pointed out to Bostick that 'plasmon' would really be inappropriate for technical reasons, and so Bostick happily adopted Pines's suggestion of the word 'plasmoid' instead.

I contacted David Pines and asked him the details of the naming of plasmoids, and this is what he said in an email to me in December 2015:

You are correct, I did suggest the name to Winston, as plasmon, a term I had earlier coined, was in the process of becoming widely used to describe a quantized plasma oscillation, just as phonon describes a quantized sound wave. And now we have plasmonics and nano-plasmonics as a major sub-field of nano-electronics.

In case anyone is wondering what 'a quantized wave' means, it refers to part of a wave forming something resembling a particle, in other words the ripple (technically called an 'oscillation') becomes a thing. The best description of this, together with the analysis of the equations applying to it, and the formation of what he called 'singular regions' by a wave, was done by Louis de Broglie in the 1950s, and I have given a lengthy exposition of this in my technical paper 'Is Particle Mass a Function of Degrees of Freedom?' in 2016, a paper that may be downloaded from my entry on [www.researchgate.net](http://www.researchgate.net).<sup>2</sup>

So it was that the word plasmoid was coined, which was to be one of the key words of the physics of plasma to come. This 1956 paper by Bostick is thus of immense historical significance. And I am happy to add further clarity here about David Pines's crucial contribution, for the historical record.

In Figure 20, I reproduce the first published drawing of a plasmoid, which appeared in Bostick's article of 1956. The three-stage drawing shows the plasma emerging from the plasma gun at left in the form of a ring, and then breaking free and becoming a closed ring, or torus. By this point the plasmoid was about 5 cm in diameter. Numerous photos were also published with the paper, showing many other strange and unexpected phenomena.

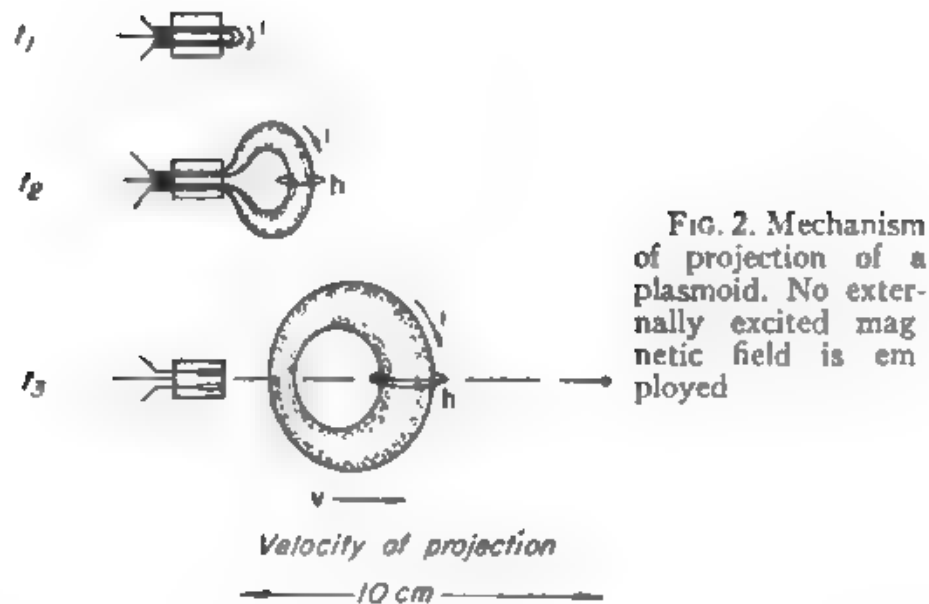


Figure 20 How to make an electric doughnut: the 'plasma gun' is at left, and from it emerges in three stages (shown as  $t_1$ ,  $t_2$ , and  $t_3$ , meaning 'time one, time two, and time three') a plasmoid in the shape of a doughnut, known in geometry as a torus. This is Bostick's own diagram from his famous 1956 paper, and depicts the first plasmoid ever created artificially in a laboratory.

Bostick's discoveries were truly revolutionary. As he says in the paper:

In spite of the fact that there has recently been considerable theoretical interest in the interactions of plasmas and magnetic fields, there had been no theoretical predictions concerning the existence of plasmoids.

In other words, no one had ever imagined that such things as plasmoids existed or could exist.

The discovery that bursts of plasma were not merely shapeless blobs but were tori (the plural of torus, i.e., doughnut-shapes) was bizarre enough. But things got much, much stranger than that. In his article and others that followed, Bostick described these features. In this first plasmoid paper, he discussed the interactions of plasmoids with each other:

Rather interesting and unexpected effects are produced when two plasmoids are projected at one another across a magnetic field. For example, the photograph shows an interaction that looks (at first sight) like an elastic collision of two billiard balls. More striking effects can be obtained when two plasmoids are fired at each other when the pressure in the vacuum chamber is raised. These effects become even more spectacular when four sources, instead of two, are employed.

When four plasmoids were fired at each other, they spun into dramatic spiral shapes, of which Bostick published photographs. They seemed to him to be behaving as living entities. 'In other words,' he wrote, 'we appear to be dealing with bodies which have strong powers of self-organization and preservation.' He also described the plasmoids as being made of a 'self-organizing putty'.

Bostick became so excited by this that he also reverted to an earlier concern with galaxy formation, and wrote: 'It is possible to apply the knowledge gained concerning the nature of plasmoids to a hypothesized process of galaxy formation ...'

What Bostick is getting at here is that the behaviour of charged plasma and plasmoids may be similar at all scales of size, from these tiny plasmoids in his laboratory to the scale of entire galaxies in space.



Figure 21 Bostick's photo, taken as a two-microsecond 'snapshot', showing what happened when he fired two plasmoids at each other. To his astonishment, they combined to form a 'barred spiral' shape resembling the well-known barred-spiral galaxies in space. As he wrote: 'Occasionally two plasmoids crashing head on break into fragments, but even these fragments seem to behave as entities. In other words, we appear to be dealing with bodies which have strong powers of self-organization and preservation.'

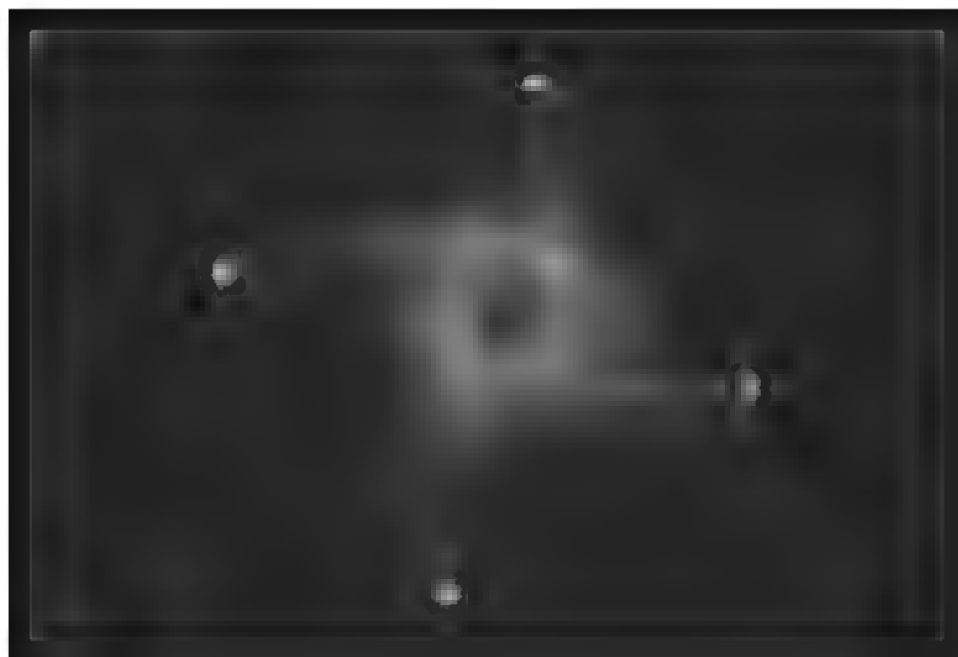


Figure 22 Bostick's time-exposure photo of what happened when he fired four plasmoids at each other, by aiming all of them at a common central point. He did this in a thin gas within a magnetic field, which is at right angles to this page. As soon as the plasmoids were fired, they ionized the gas so that electric current started flowing. The effect was this astonishing phenomenon, of a twisting and whirling ring with spiral arms.

As he says: 'The formation looks strikingly like a photograph of a spiral galaxy. We can look upon the combination of plasma and a magnetic field as a kind of self-shaping putty. Perhaps study of the forms assumed by this putty may help us understand configurations such as the stars and galaxies. It may also throw light, at the other end of the scale, on the construction of fundamental particles such as the electron, the proton, mesons and neutrinos. They, too, may be made of self-organizing putty: a putty composed of the electromagnetic field and its own gravitational forces, which, working together, create the bodies we know as particles.'

He then gave cosmological details about that, which we need not go into, except to point out that he was clearly developing the idea that the tiny plasmoids in his lab were in his opinion models of what took place in interstellar space, with plasmoids essentially spanning reaches of space that would eventually contain many millions of stars.

However, this was mostly bad news for Bostick's bosses. They wanted bombs and power plants, not galaxies. Bostick was perhaps beginning to look too much like an idealist to make the generals comfortable. They had been hoping for something quite different, an easy way to handle plasma in a magnetic environment. They did not want plasma to start misbehaving and running amok in Bostick's lab like that and forming things that were bouncing off each other and appearing to be solid. But of course they had to

find out more, so Bostick continued his investigations. And 'worse' was to come

The pace of work and of publication now sped up. By 1 January 1957, a further article appeared in *Physical Review*<sup>3</sup> This time Bostick was joined by two other authors, E G Harris and R.B. Theus, both military scientists brought in from the Naval Research Laboratory in Washington. It seems that Bostick was to work from now on with men who had military requirements and interests foremost in their minds and would perhaps keep an eye on him. Harris was a specialist in hot plasma physics. Theus was born in 1921 in Tennessee, joined the Army in 1943 as a private, and by 1956 was a nuclear scientist specializing in radiation and particle beams, who would later study the effects of radiation exposure on organisms.

The new paper was called 'Experimental Investigations of the Motion of Plasma Projected from a Button Source across Magnetic Fields'. It reported new studies showing that the speeds of plasmoids could be increased by aligning the magnetic field in a particular way.

However, there were even more unusual findings:

The great variety of curious and unexpected phenomena observed seem to indicate that the plasma does not move as an amorphous 'blob' but must possess some sort of structure that is stable for the length of time involved. We shall refer to this structure as a plasmoid. The purpose of the series of experiments reported here is to gain some insight into the structure of these plasmoids, the way in which they are formed, and the mechanism by which they move across magnetic fields.

One of the new experiments was to shoot a plasmoid at a 0.65 cm wide hole in a copper plate to see if it would go through, which it did. This was done several times and occurred in both the presence and the absence of a magnetic field. But when a magnetic field was applied, after going through the hole, the plasma stretched out at right angles to its course. They then placed a wire screen with a 2 mm mesh in front, and the plasmoid went through that even though it was far larger than 2 mm.

So then they thought, as plasmoids bounce off one another, perhaps we can bounce one off a copper plate with no hole. What happened next was really disturbing. The plasmoid passed through the copper plate as if it were not there, a phenomenon we have already noted in relation to lightning balls and 'fermions' on the quantum scale – and which is also similar to the behaviour of angels and other spiritual beings as reported in religious



traditions. Furthermore, the plasmoid did not merely go through the metal sheet head on, it even went through the entire length of the sheet when the sheet was placed flat in its path in a failed attempt to bisect the plasmoid.

Now the military people really had something to spook them. They could produce plasmoids that could pass through considerable thicknesses of metal. What could this possibly mean for potential future weapons? For the vulnerabilities of the walls of tanks? For the sides of aircraft? For the White House itself, which did not even have copper walls?

Little interest is taken these days in Bostick's work, because only a minority of scientists show an active interest in recording the history of discoveries in their fields. The ones who do take the trouble often do a wonderful job, however. If only there were more of them! But as far as Bostick's work is concerned, I have not come across any attempt to chart his efforts since the American Physical Society issued a reprint of some of his key articles in 1963, in the form of a pamphlet.<sup>4</sup>

I have managed to collect original copies of everything that was made public by Bostick at that time. I have found over many decades of studying the frontiers of science that one learns the most about a new subject by very carefully scrutinizing the earliest publications, where unguarded remarks are often made and speculative hints are dropped by the enthusiastic discoverers and their colleagues. This is especially the case with work done for military authorities. But the censors and secrecy guardians at first tend not to understand the full significance of new discoveries, so they do not always know which aspects of the new things they should be censoring; it takes them a year or two to figure it out.

So often the only time one can get some deeper insight into the new discoveries is from the initial reports. Then the steel curtain is drawn down upon the subject and no one dares talk or publish at all without written approval and very strict controls. I have known many fascinating scientific subjects to vanish entirely from public view because of paranoid censorship. Military and 'security' people tend to have no concern at all for the public's understanding of science; they are only interested in weapons and what they call 'public safety'. They make decisions, often holding science back by decades by suppressing knowledge of crucial developments.

Although the next article by Bostick to appear in print was his article 'Plasmoids' in the *Scientific American* for October 1957,<sup>5</sup> the next development in terms of the chronology of discovery was a paper of his which, although not published until 1958, had been delivered to an international conference in August of 1956 in Stockholm.<sup>6</sup> This was a live talk, the text of which was then published, with many photographs plus the text of the conference discussion that followed the delivery of the paper, in the Proceedings of that conference. Since it often takes a year or two to get such mammoth volumes containing contributions from scientists all over the world edited and printed, that was why it did not appear until 1958. This is the one paper by Bostick usually mentioned in footnotes by contemporary scientists, who have not bothered to look up his other publications. The Stockholm conference was organized and chaired by that giant figure in plasma science, Hannes Alfvén, whom we already know from Chapter 8.

Even though it was really a 1956 paper, I shall call it Bostick's 1958 paper, after its year of publication, because that is what everybody calls it. When he delivered it, Bostick was still at the Livermore Lab, but by the time of publication in 1958, he had moved to a new institution. A footnote was added describing him as 'Now at Stevens Institute of Technology, Hoboken, N.J., U.S.A.' The Stevens Institute is hardly a household name, but it is an extremely important centre of scientific and technological research on the East Coast of America, not far from New York City.

Bostick became Professor of Physics and Head of the Physics Department. Perhaps he was glad to get away from people preoccupied with military matters and be free to do some normal science, without being asked all the time what kind of weapon it would be good for. And who knows, perhaps he was glad to escape certain colleagues as well. He did remain a consultant to Livermore and in 1973 even spent a summer there on a special project with Oved Zucker. But his best colleagues appear to have been the ones at Stevens, his closest being Vito Nardi, with whom he worked for decades. Nardi's name will come up again later.

In his 1958 paper, Bostick extended his insights into plasmoids by saying something truly remarkable: 'It is entirely possible that ions and electrons ejected from the Sun come to Earth in the form of a plasmoid.'

This is an astonishing suggestion, which was later adopted by Hannes Alfvén, who also believed that huge plasmoids came in the solar wind all the way to the Earth from the Sun. Indeed, in his book *Cosmic Plasma* (1981) Alfvén even spoke of plasmoids being fired from the Sun as if from a plasma gun, thus carrying the analogy with Bostick's work even further

What is important for our argument here is that giant plasmoids from the Sun, given the complex behaviour that led Bostick to think of them as living entities, could easily be so intricate and complex in their structure that, in line with the discovery of the Kordylewski Clouds, they could even be intelligent or conscious entities. The implications of that would truly be limitless. Just imagine, for instance, that every plasmoid belched forth by the Sun and reaching the Earth or one of the Kordylewski Clouds could be in effect a program (in the sense of a computer program) and in that sense a communication of intelligence.

In that scenario, the Sun could be controlling the Earth's atmospheric phenomena directly when it wishes. Such plasmoids could also in principle contain information that receptive people could perceive indirectly as 'inspiration'. The Sun could 'talk to' the Kordylewski Clouds, the planets, our higher atmosphere, and anyone else who is listening. SETI people should really look for coded information concealed in plasma bursts coming from the Sun. But before we can explain that, we need to know some more about the fundamentals of plasmoids, and their habit of emitting signals.

Bostick reported that he had detected from his laboratory plasmoids 'signals which are believed to be associated with the magnetic fields trapped by the plasmoid'. He says 'the structure of these signals is too complex for analysis'. If that is the case for tiny plasmoids in a lab, how complex might we expect them to be in a gigantic solar plasmoid striking the Earth's magnetosphere and interacting with it? Bostick elaborates further on the solar plasmoids:

It is quite possible that ionized material ejected from the surface of the Sun proceeds and escapes across the magnetic field of the Sun in the same manner that laboratory-produced plasmoids cross a magnetic field.

Bostick then goes on to talk about how he is playing with multiple plasmoids in his lab:

several of these plasmoids can be made to spiral in consort to produce a ring of plasma not only is the torus produced automatically, but also ... it is stationary

Experiments showed that plasmoids could turn into standing waves, so like ball plasmas behaving like the quantum phenomena already alluded to known as solitons.

There are many books and papers describing solitons, but to go into them in any detail would take us too far afield. The important point to note here is that we have yet another example for the development of one of the weird phenomena observed in the quantum realm occurring in the 'human' or macro realm. They can also exist within the human body, a subject discussed in numerous publications by Alexander Sergeevich Davydov (1912-1993), who was Director of the Institute for Theoretical Physics of the Ukrainian Academy of Sciences. Two of his key books are *Solitons in Molecular Systems* (1985) and *Solitons in Bioenergetics* (1986).

Bostick's descriptions of his plasmoids became increasingly eerie:

One of the simplest results which must be understood is the 'barred spiral', which is produced by firing two sources at one time across a magnetic field the two plasmoids seem to seek each other out unerringly

Not only do we now have hunting plasmoids, we even have mating ones:

the leading edges of the plasmoids seem to seek each other out and latch on to one another After the union of the two plasmoids has been accomplished the angular momentum will wind them up into a spiral The resultant plasma and magnetic configuration then seems to be stable It is rather astonishing that such a bizarre configuration of plasma and magnetic field should appear to be stable No theoretician known to the author has a priori dreamed of such a configuration, to say nothing of contemplating its stability.

Bostick published photos and drawings of these weird shapes, which clearly delighted him He was also able to produce plasmoids with forked tails and pairs of whirl-rings composed of helical twists, which moved away from each other in space, along magnetic field lines He says that magnetic fields were trapped in these rings, but he was unable to 'explore' them further

Finally Bostick enthusiastically reminded people of the possible cosmological implications of what he was discovering:

By firing simultaneously two or more plasmoids across a magnetic field, it has been possible to produce co-operative phenomena which not only simulate the production of spiral galaxies and astronomical barred spirals, but which permit us to study these processes in the laboratory

In the discussion that followed and which was printed in the Proceedings, praise was heaped upon Bostick by various distinguished participants Patrick Blackett (1897–1974), who was created Lord Blackett in 1969 and won the Nobel Prize for Physics in 1948 for his work on cosmic rays, said that Bostick's work had opened 'an extraordinary exciting new field'. Vincenzo Consolato Antonio Ferraro (1907–1974), a specialist in magneto-fluid mechanics, said: 'This is an interesting and important paper.' And indeed it was.

Meanwhile the consternation of the military people might well be imagined. Bostick's plasmoids were behaving like mischievous imps. Everything they did was unpredictable. How could anyone ever control such wild things? They were almost as bad as people. And the essential thing for all those who are obsessed exclusively with defence requirements is always control.

### *Going public*

The publication in late 1957 by Bostick of his article entitled 'Plasmoids' in *Scientific American*, the widely read magazine that acted as a bridge between scientists and the general population, brought these matters to the attention of the wider public for the first time. One might say that this was both the beginning and the end of public awareness of plasmoids, as the subject then vanished, and no meaningful or sustained public discourse about plasmoids ever really occurred afterwards. There was a flurry of brief press articles in newspapers all over America reporting that a scientist named Winston Bostick had discovered strange things called plasmoids, but after Bostick ceased to be news, this stopped. And no one 'out there' seemed to 'get it'.

Plasmoids in the public sphere became merely a curiosity of the time, superficially reported, partially discussed in one major article by the man himself, and then, frankly, just forgotten. People's 'five-minute attention span' of which we hear so much today apparently already existed in the late 1950s.

It is worthwhile seeing exactly what Bostick did and did not say in his one genuinely 'public' article. *Scientific American* has always taken pride in having brilliant artists on their staff, who do absolutely superb illustrations

of almost any scientific subject. For Bostick's article, the magazine artists took his rather basic illustrations and turned them into spectacular displays. This did much to bring the subject vividly alive.

Bostick's *Scientific American* article commenced with this subtitle:

These little pieces of plasma (a gas of electrons and ions) are created in the laboratory with an electrical gun. They have an unexpected capacity for maintaining their identity

And on the very first page, there was a photo taken by Bostick of two glowing balls rushing away from each other and leaving luminous streaks behind, with a caption saying:

Two plasmoids are fired at each other in a vacuum chamber. It can be seen that they repel and veer away from each other, so that each of the strange gaseous shapes retains its separate identity

So the public got the idea right away that Bostick was making weird little balls of 'gas', which turned into entities of some kind. But what was this 'gas'? Bostick used his new word in his first paragraph: 'The gas is called a plasma.'

In this article Bostick paid tribute to Irving Langmuir, who had begun serious plasma research. It was Langmuir who had coined the term 'plasma' in 1928. Bostick wrote: 'The late Irving Langmuir of the General Electric Company began to study plasmas as long ago as 1921.' Bostick was fascinated by the work of his predecessor Langmuir, and took time to record Langmuir's ingenious experiments by which he was able to measure the temperature of the electrons in a neon light tube:

Langmuir measured the electrons' temperature and found that it amounted to about 20,000 degrees Fahrenheit – about twice as hot as the sun's surface

This temperature of 20,000 degrees Fahrenheit is 11,933 degrees Centigrade. And yet that same neon light tube can be held in the hand and feels cool to the touch even when the electrons in the centre of the tube are twice as hot as the Sun's surface. This information is a crucial fact, which we will need to keep in mind when we consider plasmoid entities. Anyone who thinks plasmoid entities cannot contain within a very small space huge variations in temperature, pressure, charge, and complexity, need only remember the lowly neon light tube. That is proof enough that the sort of

complexity in plasma that we will be discussing as we go along is not only possible but probable.

Later on we will encounter such things as double-layer sheaths and spiralling filaments inside plasma cylinders. And we will see how very hot and very cold plasma can exist happily side by side (protected by their surrounding sheaths, which isolate those regions from direct contact with one another absolutely) in closely adjoining regions within cosmic dust clouds such as the Kordylewski Clouds. Complex architecture within a plasmoid or plasma cloud may be built up in this way with ease, contrary as that may be to our conventional thinking and experience

Bostick returned again to the subject of galaxy formation:

Photographs of plasmoids in three dimensions show that as a plasmoid moves across the magnetic field it is twisted into the shape of a left-handed screw. The tempting speculation is that the matter of our galaxies may have been formed under the influence of vast galactic magnetic fields of one predominant orientation, which gave our matter a left-handed bias

He then describes another curiosity. In this instance, instead of ‘mating’, two plasmoids sometimes run away from each other. So, just as with humans, not everybody is attracted to everybody else, and there is such a thing as plasmoid rejection:

Under certain conditions our plasmoids form a pair of rings, which do not stay in the center of the chamber but move away from each other in opposite directions. Our plasma rings are not whirls in a fluid but are separate, independent ‘bodies’. As such they represent a form of ordered organization by nature of which we have not been fully aware until now. Here is a case of electrons and ions collaborating with a magnetic field to form bodies which, though inanimate, assume orderly, characteristic shapes and possess a firm integrity.

This should remind us of the plastic microspheres in oil that were described in Chapter 3, which mimicked the behaviour of swarming bacteria and appeared to be ‘alive’ when subjected to electric field pulses.

The lessons to be drawn from Bostick’s work have still not been fully realized. As early as the mid-1950s, it was perfectly obvious that ‘separate, independent bodies’ with ‘ordered organization’ and ‘firm integrity’ had been created in a lab from plasma. And yet, no one dared to imagine what has become clear only in the last few years, namely that these plasmoids can become even more complex than our physical bodies.

## *Plasma Comes Alive*

In this chapter, I am going to bring together arguments to show that dusty plasma in space can – and probably has – evolved life and intelligence.

The phenomenon of a burning candle illustrates the significance of dust. We have all seen burning candles, but how many of us realize that the flame of the candle is a small plasma? And why is the candle flame yellowish? That is because of the tiny particles of unburnt carbon dust (soot) embedded within the plasma, which arise out of the wax or tallow as the candle is burnt. When they reach a temperature of incandescence, they burn with a yellow colour, and that colours the flame in the way that is familiar to all of us.

The temperatures of the tiny carbon particulates as they burn in a candle flame can exceed 1000 degrees Centigrade,<sup>1</sup> and yet you can pass your finger through the flame without harm. This is another reminder of the highly complex natures of some plasmas, and that, as we mentioned at the end of the last chapter, extremely high temperatures can occur within them in pockets or isolated sections or bounded cells, while the surrounding plasma remains cool. If we do not realize and emphasize the extraordinary complexities that make these bizarre internal disparities of plasmas possible, we cannot understand the evidence that will continue to be brought forward as to how there can be – as some scientists are now claiming (and also myself in what I have said about the Kordylewski Clouds) – living, intelligent plasmas.

As plasma research progresses and becomes more and more urgent, while also becoming more and more bizarre, there are increasing numbers of experiments being carried out on what are called ‘cryogenic plasmas’, plasmas at extremely low temperatures such as we never encounter in



normal life, which can only occur on Earth in scientific laboratories, or in tubes of liquid nitrogen or other substances made in laboratories ([here](#) and [here](#)).

Scientists are creating plasmas and injecting them into substances at extreme low temperatures, such as liquid helium, to see what happens. Liquid helium is so cold that its temperature is approximately minus 269 degrees Centigrade or minus 452.2 degrees Fahrenheit. At those low temperatures, a different temperature scale is used, known as the Kelvin Scale, named after a Scottish scientist named Lord Kelvin (1824–1907). Using that scale, liquid helium has a temperature below 4.2 degrees Kelvin, also written 4.2 degrees K. The Kelvin Scale is a purely scientific temperature scale, which sets 0 at what is known as ‘absolute zero’, which we never encounter in daily life.<sup>2</sup>

Surprising differences occur in ‘high temperature liquid helium plasmas’, which are near to 4.2 degrees K, and ‘low temperature’ ones, which are much closer to absolute zero. Different phenomena appear at the different temperature ranges, and no one really understands all of that yet by any means. The reason I refer to these cryogenic plasmas at this point is because in 2005, a team of Japanese scientists funded by the US Government’s Asian Office of Aerospace Research and Development (AOARD) made an astonishing discovery.

They found ‘unexpected high temperature of charged carriers’ in the plasma,<sup>3</sup> meaning that surprising temperature variations can occur within plasmas, even when these occur within host plasmas that are very near to absolute zero. This is far more extraordinary than being able to hold a neon light tube when it contains electrons that are twice as hot as the surface of the Sun; this is like finding a patch of heaven that is deeply embedded in hell.

Let us recall that it was only in 1941 when Lyman Spitzer suggested for the first time that the huge clouds of interstellar dust that astronomers had observed for a long time through their telescopes might not be inert and useless stuff, but might be capable of becoming active and be charged dust. He said that negative electrical charges could be transferred to the dust by electrons in what he still called ‘ionized gas’, by which he meant what today we call plasma. Spitzer was making a tremendous conceptual

breakthrough, and today electrically charged dust is a subject of such importance that it is talked about every day by scientists and technologists all over the world.

That is not because they are all trying to figure out the Universe. There are more practical reasons. The dust that occurs within plasma is of crucial importance in the electronic microchip manufacturing business (where too much dust in the plasma interferes with the deposition of circuits onto microchips) and also—as we have seen—in connection with attempts to control nuclear fusion for power generation. It is no exaggeration to say that trillions of dollars are at stake on matters concerning dust, how to understand it, how to deal with it, and even how to use it.

The following year, in 1942, Hannes Alfvén, some of whose breakthroughs we examined in Chapter 8, discovered the ‘band structure’ of the solar system and was able to demonstrate that electromagnetic forces associated with a dusty plasma cloud (from which the solar system was formed) must have been dominant over the more usually mentioned gravitational forces in the formation of the solar system by contraction and solidification from—you guessed it!—dust. And that dust would have been electrified dust. Electromagnetic forces are so much stronger than gravitational ones that they exceed the latter by a factor of 10 followed by 39 zeroes.

By 1954, Alfvén had elaborated his ideas further and insisted that the planets and comets of our solar system (and by implication those of all other solar systems) were all formed as a result of the coagulation of dust particles in the solar nebula (the ‘dust cloud’ surrounding the early Sun) as a result of being electrically charged by plasma. (The dust was more important for the solid planets, of course, since the giant planets largely consist of plasma that is not solid.)

Many plasma scientists now suggest that stars form initially from dust. What happens is that the charged dust in a large plasma cloud in space coagulates to form a dust ball, which constitutes what is called a proto-stellar core, around which more of the cloud slowly collapses until a star is formed.<sup>4</sup> This would seem to be a variation on the Biblical injunction, to the effect that: ‘Remember, oh Sun, that charged dust and plasma thou art . . .’

Wouldn't it be amusing if the centre of our Sun was really a cold compressed dust ball?

As mentioned earlier (Chapter 3), in August of 1981, the satellite Voyager 2 took photos of the rings of the planet Saturn, and the rings were seen to contain mysterious radial shape-shifting 'spokes'. The scientists Jay Hill and D. Asoka Mendis in 1982 suggested that these 'spokes' consisted of charged dust, which was charged in a plasma. This was the first major invoking of charged dust to explain a solar system anomaly that had been discovered on another planet, and greatly raised the profile of dust within the scientific community. The suggestion was later amplified by Christoph Goertz and Gregor Eugen Morfill in 1983, who suggested that the charging was caused by plasma bursts on Saturn.

In 1986, Norman R. Bergrun published a book suggesting another theory about the rings of Saturn, involving an extraordinary theory connected with ET. Some information about that may be found in the footnote. It is very far from being a purely scientific theory.<sup>5</sup>

We saw earlier that in 1986, Hiroyuki Ikezi predicted that plasma crystals, known as 'Coulomb Crystals', could be formed by dust particles in a plasma. The existence of such crystals was announced at a conference in 1993 by Hubertus M. Thomas and Gregor Eugen Morfill, and in 1994 simultaneously published by three separate teams, consisting of Thomas and Morfill, Jiun-Haw Chu and Lin I, and Yasuki Hayashi and K. Tachibana. At this point, dust reached a new high!

Much of the dust in outer space actually takes the form of what are called dust grains. They are miniscule, but more solid than the kind of thing we are used to in the form of household dust.

How much dust and dust grains is there in the Universe, in proportion to everything else? According to the physicist Douglas C.B. Whittet, author of *Dust in the Galactic Environment*:

submicron-sized solid particles (dust grains) account for roughly 1% of the mass of the ISM [interstellar medium]. Despite their relatively small contribution to the total mass, the remarkable efficiency with which such particles scatter, absorb and radiate starlight ensures that they have a very significant impact on our view of the Universe. For example, the attenuation [weakening because of distance] between us and the centre of the Galaxy is such that, in the visual waveband, only one photon in every 10,000,000,000,000 reaches our telescopes. The energy absorbed by the grains is re-emitted in the infrared, accounting for some 20% of the total bolometric [bolometers measure luminosity] luminosity of the Galaxy.<sup>6</sup>

(Luminosity is a measure of the absolute brightness of something such as a star, as opposed to its apparent brightness, which may be diminished by distance and our atmospheric interference.)

Since we know that more than 99 per cent of the Universe consists of plasma, what little solid matter there is seems to exist primarily in the form of solid dust particles and grains, most or all of which floats in the vast plasma clouds. That reduces even further the amount of ‘solid matter’ of the sort that we see around us every day here on Earth, and it makes planets and moons even scarcer than we had thought, in terms of proportion of what exists, compared to everything else. That does not mean that there are very few planets and moons, quite the contrary, for we now know that there are untold billions of them. But what it means is that no matter how many there are, they still form a negligible proportion of what exists.

I do not believe anyone has calculated how much solid matter is left, after you subtract the plasma-bound dust. But as we face these facts, our familiar world is shrinking in significance all around us in the most drastic fashion. And, as I have already pointed out, if we have a science that is entirely based upon living in an atypical world, our science is going to be atypical. So we must reform it at once!

### *Are some plasmas alive?*

We have been following the observation and testing of the influence of electromagnetic fields in the work of Langmuir, Alfvén, Kapitsa, Bostick and others. Plasmas are bounded entities that persist through time, a characteristic of any living organism at the most basic level.

Plasmas may feed on fresh plasma, and be nourished, for example, by solar winds. They may even compete for such food. Plasmoids seem to bond with one another and interact in other ways.

We have seen particles in plasmas swarming like microbial beings (Chapter 3) and forming other patterns such as hexagonal structures, spirals, concentric circles and double-helix patterns (Chapters 2, 3, 11). Nerve-like filaments grow in plasmas, including those that form double helixes and may carry information as well as energy. Plasmas seethe with movement in and around their own internal structures created by electromagnetic fields. Complex plasma entities have countless plasmoid regions within them, all

protected within their sheaths and separated by ‘voids’, like organs in animal bodies.

Some contain hot plasmas, some cold plasmas, some dusty plasmas, some non-dusty voids. Some containing impurities that may hinder or accentuate the flows of charged currents in the manner of electronic semiconductors and transistors. In other words, large plasma clouds are bound to have the equivalent of semiconductors scattered throughout themselves, in order to modulate the current flows.

We have seen in the work of Peter Kapitsa that the crystalline structure of complex dusty plasmas makes them potentially far more complex than human bodies. There are soft, broadly crystal-like structures that grow into beautiful and intricate entities with the ability to transmit information over vast distances. Particles within a plasma can interact in concert with other particles.

Furthermore, and as we shall see shortly, the mysterious ability to move through objects without changing form, seen in quantum mechanics in the phenomenon associated with solitons and sometimes called ‘tunnelling’ takes place between ‘organs’ in a plasma. We will return to this later, when we will explain ‘tunnelling’.

There is no universally agreed, mathematically precise set of defining qualities of a living entity, but most accounts include growth, cellular form, reproduction, response to stimuli, ability to receive and process energy.

Of course, living beings that are not carbon based like ourselves will not be alive in exactly the same way that we are, but will be ‘alive’ none the less. We met Vadim Nikolaevich Tsytovich in Chapter 3. We mentioned that this leading Russian researcher into plasma and collaborator and co-author with Nobel prize winner V.L. Ginzberg in the 1970s, wrote in 2007 that the principles used to define life are:

- autonomy
- evolution
- autopoiesis [a system capable of reproducing and maintaining itself]

He concluded that:

complex organized plasma structures exhibit all the necessary properties to qualify them as candidates for inorganic living matter that may exist in space provided certain conditions allow

them to evolve naturally<sup>7</sup>

### *Are there intelligent plasmas?*

What are the defining qualities of an intelligent, living entity? For a plasma to count as intelligent, and with an intelligence that involves features a bit like our own – for example memory, the ability to perceive, communicate, model, choose, predict and manipulate reality – For that you may need a much greater level of complexity. You probably need a series of interdependent systems with both internal and external functions, plus an overarching system that coordinates the smaller systems.

In Chapter 5 we saw that plasmas in the form of ball lightning appear to act intelligently – or at least to operate by an intelligence. We saw how they appear to navigate, following aircraft or submarines – they know which way they are heading – turning at right or other angles, being still and then suddenly moving away at vast speeds, and even rolling down the aisle of an aircraft as if on an inspection visit.

Kapitsa's discovery of the crystalline structures in some complex dusty plasmas, discussed in Chapter 5, and the realization growing from that and based on the analogy with crystals in metals, suggested to me that it may be possible to calculate the density of electrons within a plasma. I realized immediately that this density could be crucial when calculating the likelihood that intelligence might evolve in a plasma.

This was much on my mind when I approached my friend, the mathematician and astronomer Professor Chandra Wickramasinghe, who like me was a friend and huge admirer of Fred Hoyle's and had been mentored by him; Fred supervised Chandra's PhD and they co-authored numerous works. Chandra and I agreed to co-write an academic paper on the Kordylewski Clouds (KDC), considering their potential to evolve intelligence. What follows is an edited extract with the maths removed. The full paper can be found as Appendix 1:

The Kordylewski Cloud at the point in space between the Earth and the Moon known as L5 (the 'L' stands for Lagrange) has a density over a hundred times higher than the density of ambient interplanetary dust. The maths shows that the mean distance between neighbouring particles within the cloud is thus very short indeed, yielding the possibility of inter-particle 'communication' if electromagnetic signals can be exchanged.

This could be made possible because the dust would be charged to a potential of a few volts because of the photoelectric effect caused by absorption of solar ultraviolet photons, and collisions with ambient gas would lead to rotation (spinning) at radio frequencies. Spinning charged grains, particularly those in the form of elongated needles typified by bacilli, would be efficient absorbers and emitters of electromagnetic radiation [This production of radiation because of spinning is explained more simply in a moment.] Most interestingly the total number  $N$  of such charged dust particles in a KDC (distance of  $< 1$  cm apart) would be truly vast.

With electromagnetic-wave emission/absorption across cloud dimensions as well as electrical connections (charge/current exchanges) between adjacent charged particles only centimetres apart, a Kordylewski Cloud might well be able to function as a gigantic computer/brain capable of storing and processing digital information. The maths also shows that the cloud may have a super-astronomical sum total for its potential computing power, exceeding the computing power available in all human brains, and indeed all other intelligent life on Earth as well, by very many orders of magnitude.

Finally, we refer to a few of the remarkable features that are known to characterize dusty complex plasmas and which could also play a role. The nucleation and growth of dust within such plasmas have been documented in several laboratory studies. In our case, however, the dust nucleation process will be side-stepped, and condensation within Kordylewski Clouds is likely to occur upon pre-existing interplanetary, potentially biological, dust particles. Thus, we could envisage a population of bacterial particles coated with semiconducting siliceous mantles that may well enhance inter-particle electronic connectivity. Such speculations may sound far-fetched, but they lie within a broad framework of possible outcomes based on known behaviour of complex dusty plasmas.

We might thus be tempted to view Dust Balls as highly structured ‘intelligent’ systems capable of storing and processing ‘information’ and realize that they may have many more surprising and unexpected features. Indeed, such huge stable entities that have presumably endured for astronomical timescales and have steadily grown in complexity over billions of years may display spontaneously evolved phenomena resembling those of the most highly complex living entities.

This situation is not dissimilar to the brain-like complexity of the ‘cosmic web’ discussed by Ginsburg et al. (2019), although it is potentially even more impressive in its computational potential: the Dust Balls would contain an intricate combination of charged dusty plasma in gaseous, liquid,



and crystal states, with regions of positive charge and regions of negative charge separated from each other by sheaths and double layers, and containing superconducting filaments, so that it would be difficult for us to speak of a Kordylewski Cloud as a whole being singly charged or having a total net charge (or zero net charge), since there would be so many multiple regions of varying charges that a total net charge for each cloud would only be relevant when speaking of the cloud externally, such as in relation to the solar wind which is known to be predominantly positively charged.

Readers may still be wondering how such a seemingly tenuous structure as a Kordylewski Cloud can possibly hang together ('cohere') and become so incredibly complex?

Space is full not only of dust, but also of elongated grains (not unlike rice in shape, or we may think of them as rods or cylinders), which can be as large as one micron across. A micron is also called a micrometre. It is one millionth of a metre. (The next smallest measure is a nanometre, which is one thousandth of a micron, in other words, one billionth of a metre.) So don't think you can ever actually see a 'space grain' with your eyes, as a micron-sized one is the largest, and most are even smaller.

It is dust spheres and elongated dust grains of this size that constitute the 'bodies' of the Kordylewski Clouds, and they are much too small to be detected by satellites that might ever pass near or through the clouds. But the clouds are so gigantic that there are trillions upon trillions of trillions of these constituents within them; they can be very diffuse by our standards, in other words, very far apart from the point of view of our own bodies, so diffuse as to seem almost not to exist at all. After all, at our human scale, we think of the atoms constituting our bodies as being very near to each other. Of course, the idea that our bodies are solid is an illusion. Sir Arthur Eddington asserted a century ago that all atoms consist of 99 per cent empty space; nowadays we might modify that to say 99 per cent an amorphous mist of tiny, tiny particles called quarks and gluons.

The point is that if you shrank to the size of a 'space grain', you would find that you could easily traverse an entire human body and see nothing substantial because everything of which it was constituted was too far apart to appear to consist of anything. In other words, we would all essentially be undetectable. So everything is a matter of scale. If you were the size of a



Kordylewski Cloud, you would very readily see them. You have to be big enough to 'see' them properly, or to have technology that can reveal them, as ours has done, but with difficulty.

Some of the dust grains are elongated rather than spherical, which generates the forces that are needed. That is because the space grains are each rapidly rotating, or as we can also say, are spinning. (This is no connection with the entirely separate subject of 'quantum spin' ) These rotations generate low-frequency waves in the plasma, some of which have colourful names: 'the electron whistler', 'the dust whistler' and 'dust cyclotron waves', Alfvén waves, and 'electromagnetic ion-cyclotron waves'. Many of the dust grains are essentially levitated by electromagnetic forces.

The space grains are set spinning by electrical fields. But they do more than rotate. They also 'quiver' and 'bounce', to use the very words actually used by the plasma scientists who published these findings in 2002. The idea of invisible spinning, bouncing and quivering rice grains floating around in outer space and 'whistling' may seem like some science fiction fantasy, or somebody's idea of a practical joke. But it is all true. As the scientists say: 'The dust grains execute bouncing motions ... Furthermore, each grain also performs transverse quivering across the sheath electric field ...'

The energy of the dust rotation can flow into the surrounding plasma and generate plasma waves. The grains are magnetic dipoles, meaning that they have positive and negative poles. They are charged either negatively, by thousands of electrons clinging to each of them, or positively by protons and ions clinging to them. And those charges are directly coupled to the electric field in which the dust grains reside. It is obvious therefore that these spinning grains are generating collectively a great deal of energy that pours into the surrounding plasma. As a result, microwaves are emitted and it has been proved that 'Coulomb Crystals' (crystalline structures that can sustain themselves and remain differentiated from the plasma sea) can form, thus creating the elements of macro-sized structures, compartments, and 'pods' within the plasma cloud.

So we see that it is the spinning grains that generate the energy to form structured clouds, as if they were a vast army of microscopic power generators, which 'create' the organization of the whole cloud. The number

of spinning grains inside each Kordylewski Cloud could be as many as 10 followed by 26 zeroes. As we point out (see [Appendix 1](#)), the electrical connections and current exchanges between adjacent charged grains, even if they are as much as a centimetre apart in a Kordylewski Cloud, would create a structure that might well be able to function as a gigantic computer/brain capable of storing and processing digital information.

Having described the spinning micro-generators inside the clouds, I will now clarify a strange fact about dusty complex plasmas that makes all of this possible. I am going to quote a few words from the plasma scientists Dietmar Block and André Melzer in a paper they published in 2010, but first I need to explain that scientists have a term for describing elements of a system, such as particles, which have powerful interaction energies holding them together. They call this ‘strong coupling’. (Think of a happily married couple who stick together for decades.) Block and Melzer mention how ‘strong coupling’ works in ‘normal’ solid matter, which consists of atoms with very small inter-particle distances. Then they say:

In dusty plasma the situation is different. If micrometre-sized particles are immersed in a plasma environment they immediately attain high negative charges due to the higher mobility of the electrons. Therefore, even at particle distances of the order of several hundred micrometres the mutual interaction energy of two particles exceeds by far their thermal energy and the system is strongly coupled. At the same time this strongly coupled system has a fairly low particle density and a favourable ratio of interparticle distance to particle radius. This combination results in a very high optical transparency [i.e., it is almost invisible], which allows us to observe individual particles even at the centre of clouds containing more than  $10^6$  [the mathematical way of writing ‘one million’] particles.<sup>8</sup>

Just think what this means if translated into human terms. If we speak of human beings instead of particles, it means that if there were one million people standing together in a vast crowd covering a huge area of land, they would have to be so far apart from each other that even at a distance we could with a telescope distinguish and detect every separate individual. This brings the common phrase ‘you are one in a million’ into sharp focus!

This is what a dusty complex plasma is like. Every single particle is ‘one in a million’ and can be individually detected in principle, and yet this vast and seemingly tenuous grouping constitutes a powerful structure, unified, coherent and immensely complex, bound together with overwhelming invisible strength and powerful forces. For us feeble humans, who are not

used to thinking of such things, we are like the public at the time of Copernicus (1473-1543), who simply could not imagine an Earth going round a Sun. This is how fantastically different thinking about dusty complex plasmas is from anything with which we are familiar in our lives.

An analogy here on Earth would be if we were to claim that the ocean is a giant brain. Well, it is not. That is because it is here on Earth, is made of atoms, and is physical matter. This is how different plasma really is. With dusty complex plasmas, a tenuous and essentially invisible cloud in space can hold together and become a brain even bigger than an ocean, a brain so gigantic that it is many times larger than our entire planet. We have to get used to thinking like this, and to realize that these clouds in space are so different from anything we know in our lives, or anything we could have imagined, that all of our conventional notions are completely useless.

Another crucial thing to realize about plasma structures is that they maintain their integrity by means of something called the double layer, also sometimes called a bilayer, which has helpful electromagnetic properties.

Two different plasma regions of entirely different kinds can be rigorously separated from one another by these double layers. The double layers are like a double skin, being a sheet of positive charge on one side and a sheet of negative charge on the other side. For those familiar with microbiology, they are similar to the double layers that occur within our own physical bodies as walls of cells, called membranes, with a hydrophilic (water-loving) surface facing one way and a hydrophobic (water-hating) surface back to back with it and facing the other way.

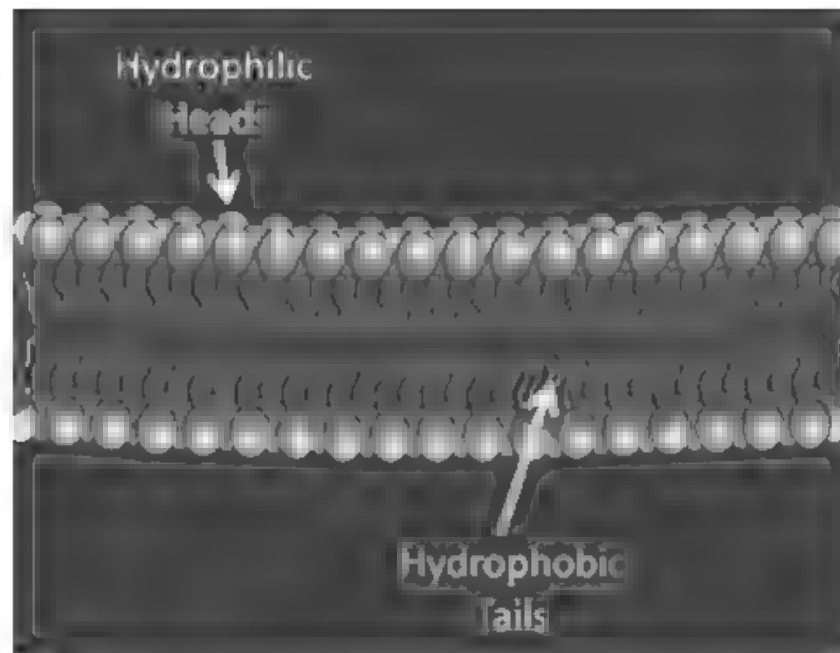


Figure 23 A typical double-layer cell membrane within a human body. Such membranes are analogous to the double layers that exist in plasma, and which surround the plasmoids and all the current-carrying filaments inside plasmas. Unless organic cells are protected by these walls called membranes, they cannot exist. The outward-facing parts of the membranes are hydrophilic, meaning 'water-loving' heads, and hence friendly to the watery environments of the cell and body. The inward-facing parts are hydrophobic, meaning 'water-hating' and they just hate being exposed to water. This excellent image comes from a course in Anatomy & Physiology, Bio 264, Cell Membranes section, at Brigham Young University, USA, and may be viewed at <https://content.byu.edu>. This is a simplified image of the basic structure of a cell membrane, although in reality there are often various 'plug-ins' sticking through and pathways for biocurrents such as flows of protons and ions across the membrane. In this book it has not been possible to take the space to discuss all those phenomena, for the discovery of which Peter Mitchell was the brilliant pioneer (By showing how currents flowed through membranes, he totally changed the previous view of metabolism as being a static chemical process, known as 'the Bag of Enzymes' theory. He replaced that theory with the true description of what really happens, which is often called Vectorial Metabolism, meaning that metabolic processes are like vectors and have a direction in space, which is far from the random processes of chemicals sitting idly in a 'bag of enzymes' like loungers on adjoining deck chairs who might occasionally have a chat or a joke.)

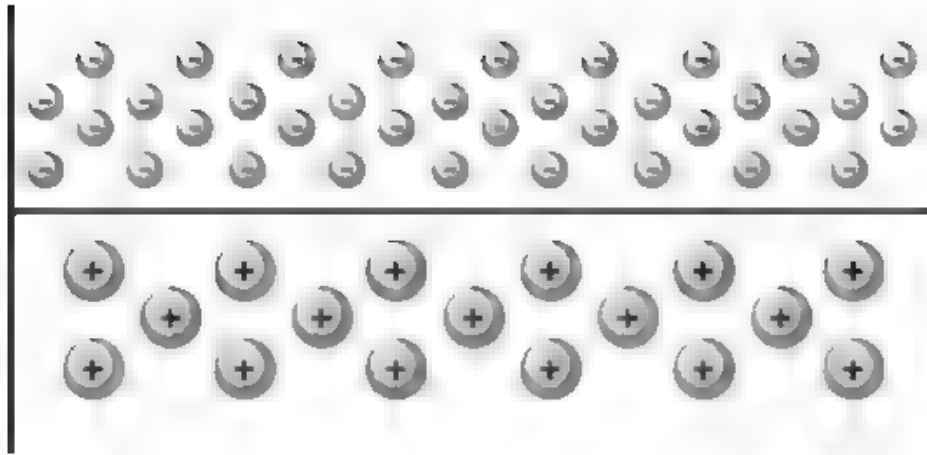


Figure 24 An electric double-layer At the top of the diagram, the rows of small circles enclosing minus signs represent electrons, which are negatively charged. (The minus signs mean 'negative' ) At the bottom of the diagram, the rows of larger circles enclosing plus signs represent protons, which are positively charged (The plus signs mean 'positive' ) Combined in this way in a double-layer, the electrons and the protons form a protective sheath which enables a blob of plasma to be protected from whatever is going on outside, and therefore to remain intact 'come Hell or high water' Such a blob can cohere and retain its integrity no matter what surrounds it, blasts rays at it, or tries to destroy it, up to a limit which is usually very high indeed. Without protective sheaths, such plasmoids and other plasma blobs, filaments, and entities would be rapidly destroyed and could have only a momentary existence. It is clear that the same basic underlying principle is at work in the double-layers of organic cells and the double-layers of plasma blobs (or 'plasma cells' as we might well call them) In other words, the principle of the double-layer surrounding wall seems to be a universal structural element found in both organic and inorganic natural phenomena, as a means of enabling entities to maintain their identities within hostile or stressful environments (Image drawn for the author by Eric Wright.)

So to refine what we said earlier about the roles of sheaths, crystals and voids in plasmas, it is partly because of these double layers that vastly differing regions can exist within a plasma body, practically side by side. For instance, you can have an extremely hot interior of one plasmoid and an extremely cold interior of another plasmoid. As already discussed, they can be practically next to one another, but can coexist because of these double layers, which help isolate them entirely from one another. It is such double layers that surround the Birkeland Currents in space, which were discussed earlier, and which transport electricity across interstellar and even intergalactic distances. Within those filamentary structures, the current spirals can be superconductive, which means that the current can pass without loss over vast distances, and there is no resistance to cause it to diminish at all.

It is often said anecdotally that the human brain contains more neurons than there are observable stars in the night sky. But the human brain fits inside a small skull. A stable dusty complex plasma ball of immense size, which has possibly endured for aeons and experienced continual growth and expansion over countless millennia, is in principle capable of developing something resembling a much more complex nervous system than a human brain with its average lifetime of around a hundred years. A complex dusty Kordylewski Cloud that has existed for many millions of years might even have become self-aware, with all that this implies. It is conceivable that Fred Hoyle's fictional *The Black Cloud* has a reality in the context of Kordylewski Clouds – which, of course, he could not have recognized in 1957.

I would recommend Hoyle's science fiction novel to everybody, as it is a thrilling and scientifically based tale of cosmic menace and the race against time to save our species.<sup>9</sup> In the book, a dark patch is noticed in space by astronomers looking through a telescope. It wasn't there before. How did it appear? What is it?

Over a period of time, the dark patch gets bigger and bigger. The conclusion is inescapable: it is headed our way! It gets more and more threatening as it gets closer. Eventually the astronomers notice that it is a gigantic cloud that emits no light, hence is a 'black cloud'. No one knows what it could possibly be. It must be stressed that this extraordinary anticipation of the existence of the gigantic dark and invisible clouds in space resembling the Kordylewski Clouds was published at a time when space was regarded as a vacuum, four years before Kordylewski reported his extraordinary discovery.

As the cloud gets closer and closer, the fate of the Earth and all its inhabitants is threatened, since the Sun's light will be blotted out. It is discovered that the black cloud is a huge intelligent entity with a gigantic brain (we might even think of it as a non-glowing plasmoid). Intelligent contact is established with the cloud, and Hoyle satirizes the political as well as scientific hysteria on Earth.

The public are kept uninformed for as long as possible, of course, since that is always official policy. And just when the Earth is about to be destroyed and everyone is prepared to die, something unexpected happens.

The black cloud with its super-sensitivity to distant signals in space picks up a signal from very far away indeed in another part of the galaxy. It is another black cloud! So the black cloud, which is about to engulf the Earth (not intentionally, but because it is big and clunky), suddenly changes course and rushes off to find a new friend, and the Earth is saved.

Fred's novel brings up the obvious subject of communication with the Kordylewski Clouds. If the clouds are as intelligent as I am suggesting, then they already know all about us while we know almost nothing about them.

In conclusion, from Chandra's and my paper we can see that the particles in dusty plasmas such as the Kordylewski Clouds can be close enough to exchange electric signals.

In Chapter 14 we will look at other great scientists who have developed ideas that can help us understand more clearly how intelligence in complex dusty plasmas might work, including Paul Dirac and David Bohm (1917-1992).

And we will look too at the role that quantum properties in plasma might have had, not only in the development of superintelligence in the Kordylewski Clouds and the development of quantum computers, but in human beings too.

## *The Mysterious Case of the Dirty Gas*

Our bodies are so covered with bacteria that there are ten million bacteria to be found on every square centimetre of our skin. Fortunately, most of them are friendly. And we thought maybe they stopped there, our skin being presumed to be the boundary of our bodies. But then we found out that things are not as simple as that.

In late September 2015, a flurry of news reports appeared in the media about an article that had been published in a scientific journal by Dr James F. Meadow, an American microbiologist then doing post-doc work at the University of Oregon, where his PhD was in Ecology and Environmental Sciences.<sup>1</sup> He has now become the Lead Data Scientist at the law firm Dillon-Harrison's biotechnology service, Phylagen, in San Francisco's Bay Area.

In his article, Meadow reported the results of experiments he carried out with a group of people concerning the bacteria that he knew covered all human bodies. What he discovered was that the bacteria formed unique 'clouds' surrounding the bodies. His scientific report on his findings was published in the online journal *PeerJ*, on 22 September 2015, by him and six colleagues.<sup>2</sup>

The amazing findings revealed that people can be uniquely identified from their 'bacterial clouds', which are equivalent to fingerprints or iris scans. Everybody is surrounded by a cloud consisting of millions of bacteria. The exact sizes of these clouds have not yet been measured, but the clouds appear to extend for several feet beyond the body in all directions. When we walk around, therefore, we are really clouds of bacteria with a hard core called a physical body. As for the body itself, the cells within it and supposedly 'constituting' it are outnumbered by the



microbiological entities (bacteria, fungi, and viruses) living on it and in it by ten to one.

What this means is that only 10 per cent of the cellular components of ourselves are really what we think of as us, and 90 per cent is a cloud of microscopic parasites that follows us around. However, most of that 90 per cent used to be us, and was ejected. So if you follow the logic through, what this means is that 10 per cent of us is currently us, 90 per cent was us in the past, and thus we are in a sense made up of 90 per cent past and only 10 per cent present. Never in the course of human history has proof been so forthcoming that people really do come with baggage!

According to Meadow and his team, humans emit ten million particles per hour, which means that we emit 240 million particles per day, into the air around us. Upon learning this, it did not take me long to figure out that the sedentary lives most of us live today, compared to the lives of our ancestors who spent so much time outdoors having their bacterial clouds being buffeted and continually blown away by the winds and breezes, obviously means that the concentrations of our personal bacterial residues are much greater than those of our ancestors. If our houses are well-insulated and have no breezes or airflows, as older houses with open chimneys always had, then we are living daily in incredibly dense concentrations of bacteria, fungi, spores and viruses.

In Meadow's studies of microbial clouds, he specified that the particles in those clouds included also 'resuspended dust' and 'emission from clothing', so in order to eliminate clothing dust from his experiments as a variable, he had all his subjects wear the same clothes. The billions of microbes we emit may be harmless to ourselves, but not necessarily harmless to people visiting us. For they have their own clouds, which are not necessarily compatible with our clouds, and they may be vulnerable to the highly intensified microbial concentrations in our excessively insulated home environments.

The interactions of different people's bacterial clouds have not even begun to be studied, and neither is there yet a science of bacterial habitats for bacterial clouds, although microbiology is constantly producing studies of bacterial colonies on and within humans and on our cell phones, our computer keyboards, our doorknobs, and our TV remote controls.

Getting nervous? You ought to be. The COVID-19 pandemic should have brought home to people by now the importance of what, during the epidemic, came to be called ‘social distancing’. In fact, being six feet (two metres) apart from each other in order to avoid contamination of one another is a confirmation that forbidding our surrounding microbial clouds to touch can prevent us getting infectious viruses. The irony is that none of the medical authorities who recommended this social distancing appeared to be aware of the existence of our microbial clouds. They ‘instinctively’ knew that we must be six feet apart, and justified this by speaking of airborne droplets, or just because it ‘seemed sensible’.

It is time they learned the full facts, which provide a sounder justification for their instinctive policies. The good news is that they pursued a sound policy in this regard anyway. Masks, however, make little difference to our microbial clouds and are pretty useless except in intensive care wards, because the viruses are a thousand times smaller than the smallest holes in the masks worn by the public during the pandemic. (Intensive care masks work, the ones made available to the public don’t.)

Rather than speaking of ‘bacterial clouds’ we should more properly speak of ‘microbial clouds’, which include all species of entities emitted by our bodies at every moment of the day and night, and include fungi and viruses. And there is a close connection between these microbial clouds and dust, for a great deal of household dust comes from tiny bits of shed human skin, all of which carry bacteria on them, and those bacteria are carried off the body and then leave the skin flakes and float up into our microbial clouds and join in the merriment of ‘being microbes together’.

Microbial clouds and dusty plasma are analogous in many ways as both are made of invisible and microscopic particles. And later in this chapter and the next I will be examining the work done on what are called our ‘bioplasma bodies’, which are invisible and which surround us, just as the microbial clouds do. The concept of bioplasma bodies suggests that we are jointly constructed of physical bodies and bioplasma bodies, which operate in synch.

The further suggestion is that when we ‘die’, because our physical body has worn out or been damaged beyond repair, our bioplasma body may detach from our physical body and abandon it to ‘death’. We might be said to continue to exist as bioplasmic beings made of non-atomic matter – of

plasma. On this way of looking at it, the 'soul' is thus material, but in a different and more rarefied sense than was the physical body. This leads to the concept of bioplasma beings existing without 'physical bodies', and I suggest that this is what is often referred to as 'the Other World'

Traditionally it has been called 'the spiritual world', upon the assumption that it must be wholly immaterial. It was assumed that body and spirit were entirely separate, one being 'material' and one being entirely non-material. I touched on this earlier, and it is what I regard as the prime fallacy of our Western civilization (as previously explained, it is not a fallacy that was ever traditionally adopted by the Chinese.)

But we must return to our discussion of the microbial clouds. What I want to raise as a question now is this: are the microbes in the clouds themselves charged? As we will see as we proceed, there are many researchers who insist that we have invisible counterpart bodies made of plasma (bioplasma) that surround us and extend several feet from us, so how does this relate to the fact that it has suddenly been discovered that there are invisible microbial clouds surrounding us?

Could and should we call our microbial clouds our extended bodies? And could our bioplasma bodies be continually interacting with our microbial extended bodies (clouds)? Or could they even be the same, with the microbes taking the place of the charged dust grains that one finds throughout space, for example, in dusty plasmas? And since all of those hundreds of millions of microbes that surround each and every one of us are alive, can they possibly all be coordinated by a plasma body that charges and energizes and forms them?

Even if the microbes themselves are not charged, there is sufficient dust accompanying the microbes within the clouds to make it reasonable to say that we are all perhaps surrounded by charged microbial clouds, if only on the basis of the accompanying charged dust that is within them. As for the effect of charge upon bacteria and viruses, I know of no experimental investigation of this that has ever been undertaken.

In a paper that is in preparation at the time of writing, I call for such experiments to be done. Things to be investigated include this question: if a virus is positively charged, does it act in one way, and if negatively charged, in another? We do not even have the answers to questions as fundamental as that. We have been through an entire pandemic without knowing whether

we could have intervened against the COVID-19 virus by the use of electric charge or magnetic fields. That is a shocking dereliction by the worldwide medical profession.

My own opinion is that COVID-19 viruses travelled on the winds in charged 'viral clouds' protected by sheaths, which explains why outbreaks were able to take place on cargo ships at sea, which had had no contact with anyone for six weeks. What makes such a viral cloud suddenly 'dump' may be connected with encountering powerful thunderstorms. The Earth itself is negatively charged, as all lightning experts will tell you. Ordinary rain varies in its charge. High rain is positively charged while low rain is negatively charged. Most people do not know any of this. Virologists should really be given crash courses in geophysics.

I would suggest that most or possibly all 'bacterial or virus colonies' are unified entities in some way, but that when it comes to microbial clouds, that must be true to a higher degree. If we all have invisible microbial clouds and also have invisible 'bioplasma bodies', and both surround our dense physical bodies and both are approximately the same size, then how could they not interact with one another? Is it possible that the microbes that stream off us at the rate of ten million per hour become charged by the 'bioplasma body', become subsumed within it, take on its shape, and lend substance to it? I do not see why not. Indeed, it may well be the microbes and dust continually sucked into our bioplasma bodies that enable our bioplasma bodies to function in relation to our physical bodies.

When scientists can figure out how to do so, the sizes, shapes, and configurations of our microbial clouds will surely merit close study. In addition, we will need to examine the electrical charges, whether positive or negative or both, of the microbes and the accompanying dust within our personal clouds, and, most important of all, try to determine whether the clouds have cellular internal structures. For if they do, that means that there are insulated pockets within the clouds that can contain microbes and dusts of highly varying characteristics.

For instance, there could be cloud-cells full of positively charged microbes, cloud-cells full of negatively charged microbes, cloud-cells in which toxins and pathogens are isolated, and charged double-layer boundary layers resembling membranes separating the cloud-cells from one another. In the event of ill health, such boundary layers might break down,

and pathogens that would normally have been safely contained get released. If we could determine such things happening, we would have early warnings of disease

We should also urgently undertake investigations of the effects of aerosol sprays on our microbial clouds. They would in my opinion be certain to alter the ultra-weak charged currents in our clouds. But before we can even examine that, we need to know what kind of charge aerosol particles carry. Are they positive or negative? 'Charge' can be defined as 'a quantity of electricity or proticity'. 'Charged particles' are called particles because they are small. But they are called 'charged' because they have either a positive charge, like a proton or ion, or a negative charge, like an electron.

Positively charged dust particles and grains tend to be larger and slower moving than electrons. A positively charged dust grain can easily have 10,000 or more electrons adhering to its surface, like sperm chasing a single egg and irresistibly attracted to it. And yet no one appears ever to have thought about the charges that exist on aerosol particles, particle sprays of perfume or cologne, dust particles from talcum powder, tissue dust when we wipe our noses, and antiseptic sprays that fill most restaurant serving areas as the staff wipe the tables using a technique of 'reconnaissance by fire', i.e., first spray your way in, and then close with the enemy and wipe. (If the adjoining customers choke, ignore them.)

Ignoring all these sorts of things is a danger to public health.

I recommend the creation of a new scientific discipline, which could be called electro-microbiology. Scientists working in that field should attempt to study the charging of microbes and accompanying dusts. For instance, if you take a microbe and give it a positive charge, what is the difference between that and taking the same microbe and giving it a negative charge? How do groups, or colonies, of microbes behave when they are: (a) positively charged, (b) negatively charged, and (c) both? How do microbes of the same charge relate to each other? Of the opposite charge? And how do these interactions differ from uncharged interactions?

Putting aside the bacterial clouds, what about the human body itself? It is a little-known fact that one-fiftieth of our body weight is made up of bacteria that are inside or on the surface (skin) of the body, and these are all in addition to the ones in the clouds that are outside the body.

The number of bacteria living inside us is so great that our bodies contain 10,000 times more bacterial cells than actual human cells. And as for the surfaces of our bodies, as we have already learned, there are so many bacteria on our skin that approximately ten million bacteria live on every square centimetre of our skin. They mostly live in the outer layer of the skin, the stratum corneum, which is made up of dead skin cells. So the surfaces of our bodies largely consist of dead human cells filled with enormous colonies of live bacterial cells. The total bacterial biomass on the Earth is a thousand times greater than the total world human biomass. Earth is thus the planet of the bacteria, not the planet of animals and humans.

Furthermore, the bacteria multiply their numbers so fast that if we completely cleansed a patch of our skin of bacteria it would take less than twelve hours for them to grow back again to the same numbers.<sup>3</sup> And now we also know that in addition to that we are surrounded by clouds of further bacteria and microbes, as I have just described. So what does that make us? Our bodies are largely bacterial support, incubation and transport vessels. Fortunately, the majority of 'our' bacteria are beneficial to us, for otherwise we would have died out as a species long ago.

It is possible that most microbiologists of today do not know enough about plasma to realize that it acts as an excellent conductor of charged currents when there are imbalances of charge in the plasma, or when the plasma has a cellular structure, such as we find in the Earth's atmosphere or in dusty plasmas such as the Kordylewski Clouds. (As we have seen, cellular structure implies the existence of boundary layers, known as 'double-layers', surrounding the cells, and these layers themselves carry currents, often very powerful ones.)

If the microbial clouds around us are charged by plasma or become part of a plasma cloud, or even generate a plasma cloud through their own charges, then they can potentially carry electric currents, whether electricity (negatively charged currents) or proticity (positively charged currents). And of course, once you have electric currents, you get magnetic fields. We may thus be surrounded by highly complex ultra-weak currents and fields, the existence of which no one has ever suspected until now, at least not ones involving microbes and dust.

What is more, we cannot rule out the possibility that the toxic characters of some microbes will be cancelled out, or enhanced, by charge. And if there are electric currents and magnetic fields surrounding us within our charged microbial clouds, these too can have beneficial or harmful effects on us. I am inclined to suspect, however, that the average effects must be helpful, because otherwise how would we have survived throughout the ages?

The electric currents and magnetic fields that would thus occur within our microbial clouds would be what is known as 'ultra-weak'. This means they would be extremely hard to detect 'Ultra-weak' sounds as if such currents and fields would be of negligible effect. However, there is a massive amount of scientific evidence concerning the crucial importance of 'ultra-weak' fields and currents in relation to the human body. Much of the work done in that field is furiously opposed by various corporate interests, especially those of the big power companies, because the studies largely are related to what is known as 'electro-pollution', a subject which 'Big Money' wants to hush up, because it threatens their financial interests.

It is not only that living beneath power lines is dangerous, which is something everyone can readily understand, but also the intense radiation produced by 5G poses great risks to people. However, that is not for discussion at the moment. I mention it here only to point out how overwhelming the evidence is that the human body is 'ultra-sensitive' to the 'ultra-weak', especially to what we will describe later as 'bio-photons', and indeed to any and all forms of electromagnetism.

We must not forget that the body itself is electro-magnetic

The relevance of electricity and magnetism to the human body was revealed very dramatically in 1963, when Gerhard M. Baule and Richard McFee made the first scientific detection of a naturally occurring 'biomagnetic field' in the human body, and they proved the existence of a magnetic field associated with the action of the human heart<sup>4</sup> The electrical and magnetic aspects of the human heart are now universally accepted, but it was very painful and difficult for scientific and medical experts to accept this discovery at the time, because it went against the 'body as a machine' theory, by which everything was supposed to be chemical and mechanical. (Modern machines use electricity, but 'the body as a machine' theory did

not allow for that, and was essentially based on models of clocks and nineteenth-century factory machines.)

Pre-existing fixations, theories rigidly adhered to, ossified notions, and fixed opinions are the great enemies of progress in science; but scientists are human beings, with all the limitations that that implies.

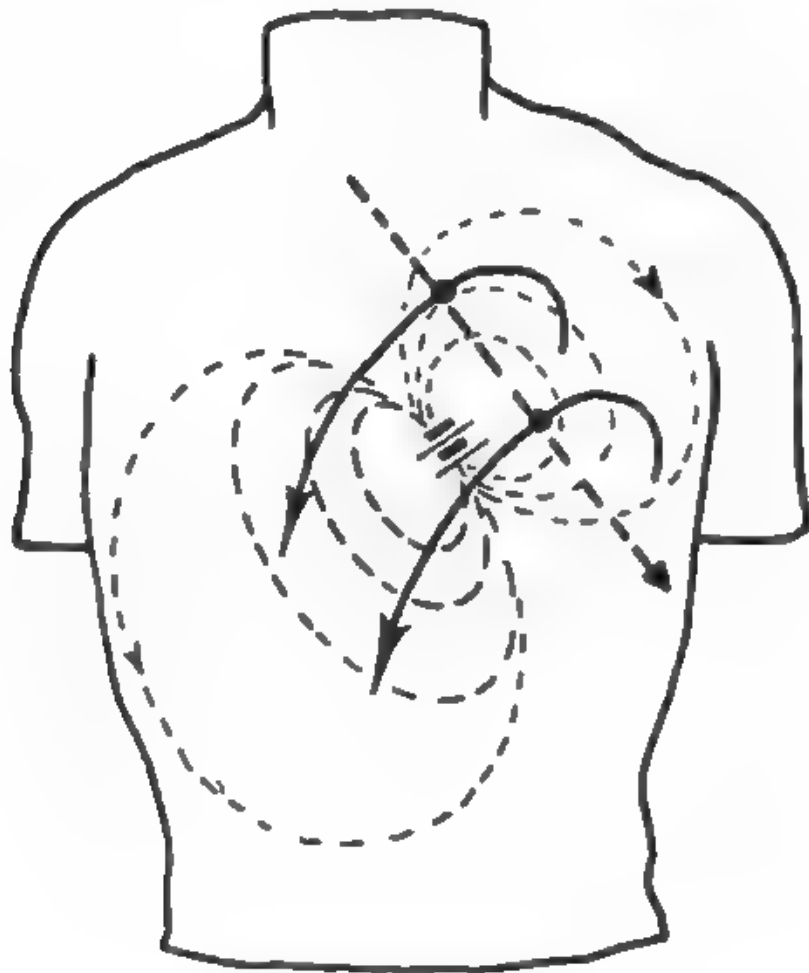


Figure 25 A diagram showing the electrical and magnetic activity of the human heart. The solid lines depict 'lines of force' with directional arrows, demonstrating that the heart's magnetic field travels from left to right across the human chest. The dotted lines show the electrical current produced. The artist has drawn a schematic small electric battery at the location of the heart to suggest the electromagnetic nature of the heart. From Gerhard M. Baule and Richard McFee, 1963 (see [Footnote 4](#) to this chapter)).

Over the decade that followed Baule and McFee's findings, further understanding was gained, and in 1970, David B. Geselowitz (1930–2020)



published a preliminary paper,<sup>5</sup> and then in 1973 wrote a very lengthy technical account of the subject of the magnetic heart and biomagnetism,<sup>6</sup> in which he said:

The past decade has seen a dramatic improvement in the ability to measure biomagnetic fields. They are extremely small, about one million times weaker than the Earth's magnetic field in the case of fields of cardiac origin and even smaller in the case of fields originating in the brain. Hence, the detection of these fields has been a major experimental challenge. Nevertheless, it has been possible to develop instrumentation so that such fields can be measured almost routinely.



Figure 26 The magnetic field around the human head. The magnetic field goes from the left hemisphere of the brain around the head and back in through the right hemisphere. The 'lines of force' have been drawn to depict this, with the arrows showing the direction of the field. From Gerhard M. Baule and Richard McFee, 1963 (see [Footnote 4](#) to this chapter).

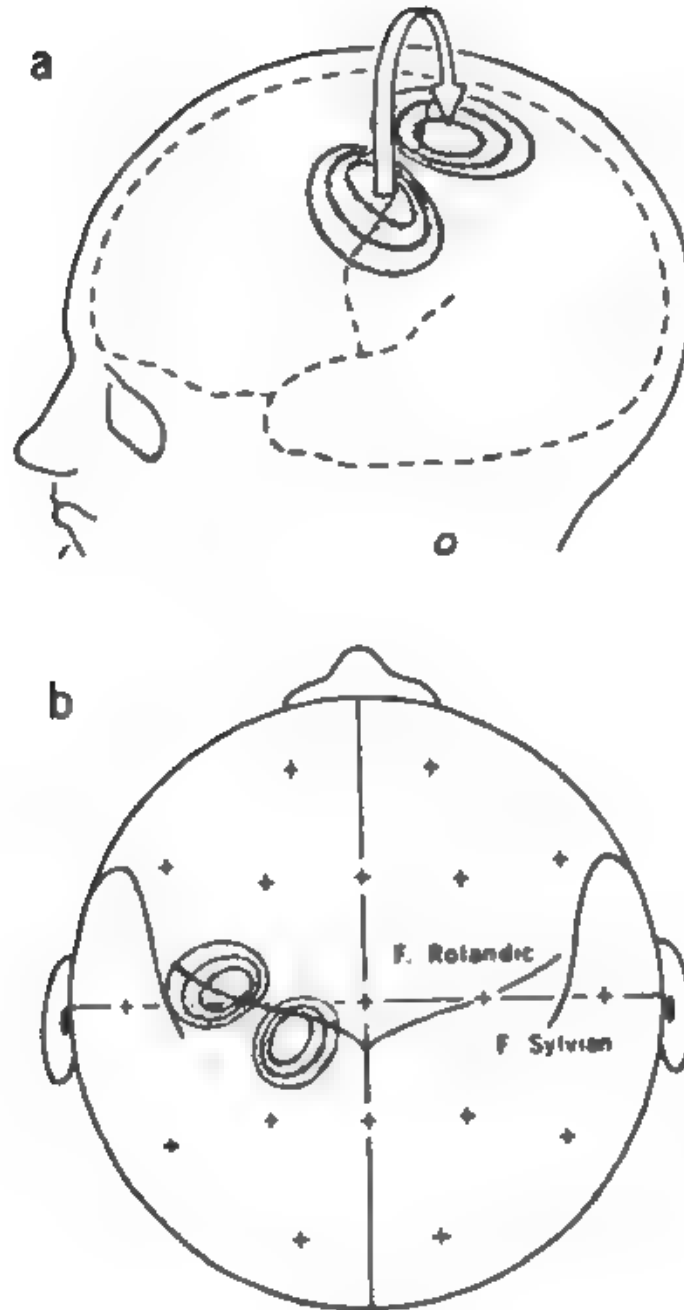


Figure 27 A separate magnetic field in the brain to that shown in Figure 26, and discovered subsequently. This field is sharply localized in a tiny region of the brain's left hemisphere 'a' side view (with the arrow showing the field direction goes from left to right, as was the case with the field shown in Figure 26, and 'b' top view. This field is an 'evoked' field, created by shooting electric current into a person's finger! From Gerhard M. Baule and Richard McFee, 1963 (see [Footnote 4](#) to this chapter).

These biomagnetic fields are crucial to our 'bioplasma bodies', as they continuously interact with our physical bodies through the actions of

electricity and magnetism. We will return to the revolutionary idea of bioplasma bodies in the chapters that follow.

### *Electro-magnetic clouds around us*

After I had written the above, Marco Bischof, an eminent Swiss writer working in Germany on the frontiers of science, sent me copies of all of the articles he had by Freeman W. Cope concerning the existence of superconductivity (which as we have seen, occurs when electricity flows without any resistance) within organisms, including our own bodies. It was originally thought that superconductivity could only happen at a temperature not far above absolute zero. Then it was discovered to be possible at higher and higher temperatures, and then it became common to suggest that it could happen at room temperature.

I had come across Cope's early articles in the mid-1970s and wanted to write about them at that time, but my literary agent and all potential publishers were scornful, insisting it was nonsense and that no one would be interested. Even to publish an article about it in a newspaper (and I was doing plenty of science stories for the media in the late 1970s) was impossible. There was a complete wall of steel erected in people's minds against the subject.

I will be returning to this later. I only mention it now in order to explain that I asked my friend Marco if he had any articles by Cope, the best-known researcher into the subject, which I did not already have. He sent me some, and along with those he sent five more by Cope on an astounding branch of study of which I had no previous knowledge. Furthermore, they came to my attention shortly after I had finished writing about electrified dust and microbes forming a cloud around the human body. Talk about perfect timing! It is those articles by Cope which I will discuss now.

Freeman Widener Cope was unquestionably one of the great pioneers of biochemical research. In 1982 he died rather young, aged only fifty-one or fifty-two, so that his work was tragically cut short. As far as I can determine, he spent his entire professional career working for the US Office of Naval Research, which as we have seen does all the secret work 'for the Navy' (really shared with the entire American security establishment) and is scientifically by far the most important of the four main American

defence security agencies. Cope was Head of the Biochemistry Laboratory of the Naval Air Development Center in Johnsville, near Warminster, Pennsylvania. All of Cope's work was funded by designated grants from the Office of Naval Research, officially acknowledged at the end of each of his articles.

Prior to his work on superconductivity, Cope had been engaged in wholly different routine work in the Biochemistry Division of the Aerospace Medical Research Department of the Bureau of Medicine and Surgery of the US Naval Air Development Center of the US Department of the Navy. He wrote a number of reports, and his Report No. 5, dated 2 July 1970, was declassified at some time subsequent to 1979, so that we can see what he was doing. The title of the report was 'Activation Energies of Acceleration and Hypoxia Stress'.<sup>7</sup>

Hypoxia is a deficiency of oxygen. He was studying the stresses imposed on pilots by rapid acceleration and oxygen deficiency. He concludes that 'moderate brain damage' may result and points out that 'tolerance to acceleration stress is not limited simply by the ability of the nervous tissue to endure hypoxia, but must be dependent upon additional mechanisms'. This shows that he was doing highly important 'normal' work concerning the health of naval pilots.

But then everything changed. Cope was taken away from his normal research and instead he remained until his death the Naval agency's special researcher into everything weird.

The Office of Naval Research does not exist simply to figure out how to stop ships from sinking and facilitate communications between submarines. It has a huge remit, which covers almost any scientific subject you can imagine, many of those subjects being very 'far out' indeed, beyond the known fringes of science. The Naval agency even joins with or competes with the Air Force agency to research the atmosphere! They are, of course, unaccountable to Congress for their budget, being 'secret'. All their scientists work under the most stringent security rules, have to sign many secrecy agreements, and can only publish what the agency permits them to publish.

And yet, out of this secretive milieu, not only did an amazing discovery come, but the people vetting publications actually permitted it to appear in

print. I suspect they realized their mistake too late, because it was not necessarily obvious at the time how much they were 'letting slip', and what the implications would be. I suspect they also must eventually have become nervous of Freeman Cope, who appears to have been an idealistic scientist, and the last thing a security agency wants is an idealist of any kind.

It is not easy to summarize briefly what Freeman Cope was proposing in his five revolutionary articles, because they cover complex matters to do with theories of electricity and magnetism, quantum theory, and some unfamiliar concepts of physics not normally discussed. But before I get to that, I must analyse how embarrassing the revelations of Cope really are regarding the Naval agency's files. This cannot have occurred to the censors at the time, for nothing explicit is said that could have breached Cope's secrecy agreements. It is only when all five articles have been read carefully, if one knows something of the background, that it becomes clear what was really going on, and why Cope became involved in this research in the first place.

For what had clearly happened was that the Naval agency had asked Cope to examine the seized secret papers of Wilhelm Reich and give his opinion as to whether there was anything to Reich's weird ideas. In other words, he was tasked with an evaluation of one of the stranger collections of scientific files in the agency's possession.

What seized files? Wilhelm Reich (1897–1957) was an Austrian psychoanalyst and one of the most brilliant students and protégés of Sigmund Freud (1856–1939). In 1922, he became the director of Freud's outpatient clinic. He began to develop ideas that went beyond Freud's, to do with the energy released in human orgasms. He began to speak openly of sexual matters and to promote more open sexuality in society. This caused a great deal of alarm in Vienna. He was also passionately anti-fascist, and he fled Austria for America in 1939. He lived there for the rest of his life.

But in America Reich caused even more alarm because he was speaking openly of orgasms, and as everyone knows Americans in the 1930s, 1940s and 1950s didn't have any. Reich's main interest in them was their release of a special kind of energy. He called this 'orgone' energy, and he regarded its release in orgasms as being only one of its many manifestations.

It was, in his opinion, a genuine universal life energy. Reich carried out many elaborate researches, attempting to find out what this strange

undefined energy really was. He came to believe that most of it appeared to come streaming in from the Sun, so he viewed it as part of what came to be known as the solar wind, but he believed it was not light, or electrons or protons or ions. It was something else, he did not know what.

Reich's theory of 'orgone energy' was that it was the essential life energy of all living beings, and that the sexual orgasm was a specific form of a general biological phenomenon (occurring in all creatures in different forms and for varying purposes, but found in specialized form in humans sexually) to do with 'an involuntary contraction and expansion of the total plasma system' resulting in an 'energy discharge', in which a bit of the orgone energy was released. He believed that orgone energy could occur in the form of tiny particles, which he called bions. Reich had concluded:

that every living organism is a membranous structure that contains an amount of orgone in its body fluids, it is an 'orgonotic' system. Thus, the term orgone comes from 'organism' and 'orgasm', and means an energy found within all organisms and basic to the orgasm reflex.<sup>8</sup>

Because he was a protégé of Sigmund Freud, Reich emphasized the sexual part of this theory, causing a certain amount of hysteria amongst many people who did not like open discussion of sex at all. Reich had published his book *Die Funktion des Orgasmus* (*The Function of the Orgasm*) in Vienna as early as 1927, carrying forward Freud's theories of the sexual energy called libido. Reich was not a physicist, and parts of his research were rather amateurish. Despite this, he made some significant and important discoveries.

He also designed 'orgone accumulators' to capture and store the orgone energy. At the time, there was no explanation for how they worked, and most people naturally assumed they were a fantasy and that Reich must be a madman or a charlatan, or both.

But there were some people who knew that Reich had stumbled onto something. It is necessary to give some of the political background to this, as one of the side effects of what happened was to suppress for many decades any public discussions of plasma, especially of cosmic plasma and any plasma or electronic functionalities within living systems. In Chapter 14 we will see related actions by the same people to suppress the work of the Nobel laureate Albert Szent-Györgyi, who like Reich had sought refuge in America. All these actions were part of the same systematic pattern of

persecution intended to prevent public awareness of certain sensitive issues that many immigrant scientists imported into America after the Second World War for defence and security work.

It was in 1947, the year of the formation of the CIA, that a campaign to attack and discredit Reich commenced. That was at the same time that Nazi scientists were being brought to America at the instigation of Allen Dulles, who in the 1930s had been employed by the Gestapo's front organization in America, the American subsidiary of I G Farben (famous as the manufacturer of the poison gas that killed the Jews in the death camps). He had also refused to act to save the lives of Jews being killed by the Nazis, of which he was informed at least as early as 1942.

In 1944, Dulles simulated horror at pretending to hear about the holocaust for the first time, whereas he had known all about it for at least two years, and had not only refused to do anything to stop it, but prevented others from acting. The shocking details of Dulles's lies and duplicity in relation to this issue of the genocide of the Jews are documented by David Talbot of the *New York Times* in his book *The Devil's Chessboard: Allen Dulles, the CIA, and the Rise of America's Secret Government*, published in 2015.<sup>9</sup>

Dulles was a close friend of Hitler's banker, Hjalmar Schacht, President of the Reichsbank, who had created a thriving economy in Germany, which enabled Hitler to go to war. Dulles was also a close friend of the American traitor Tom McKittrick, a former New York banker, who in his role as head of the Bank of International Settlements (BIS) at Basel in Switzerland (very near to Bern, where Dulles was based after November 1942) treasonously laundered stolen gold for the Nazis and obtained foreign currencies for them to enable them to buy essential war materials, such as the tungsten from Portugal and the oil from the Ploesti oil fields of Romania. McKittrick even went so far as to receive many tons of gold from the Nazis that he knew to have come from the teeth of Jews murdered in the death camps.<sup>10</sup>

Later, Dulles was to defy direct orders from President Truman about bringing SS men to America in defiance of American law. One can probably attribute to Dulles the origin of the CIA's traditional arrogance, its certainty that it knows best, and its contempt for mere presidents. In other words, we may probably regard Allen Dulles as the founder of what has

come to be called by the name of the Secret State. Certainly the partiality of Dulles for the Nazis is well established, and authoritarianism seems to have been institutionalized within the CIA, an organization in which love for democracy seems to be in short supply.

As Talbot says of Dulles, viewed from the perspective of 1942: 'He was running his own foreign policy,' and from the perspective of today: 'Dead for nearly half a century, Dulles's shadow still darkens the land.'<sup>11</sup>

After the war, Project Paperclip, and other similar projects with different names, got properly organized, and the American security establishment was being powerfully manipulated by the imported Germans, some of whom went straight into important positions. Many of them went to work for the US Army, Navy and Air Force security agencies. (The Air Force was formed for the first time in 1947, having previously been a branch of the Army.)

It was easy to attack Wilhelm Reich, who was a highly eccentric loner. Reich was arrested, his orgone accumulators were hacked to pieces with axes by FBI men in front of his eyes, their remains burned, and there were two book burnings of many tons of his published works. This was ironical, because Reich's books had been publicly burned on the orders of Himmler's SS in Austria years before, and now here were the American imported SS men doing it to him again, with the aid of their FBI colleagues. Yes, this really happened in the United States, 'the land of the free and the home of the brave'.

The SS men also violently hated Wilhelm Reich for his anti-Nazi 1933 publication *The Mass Psychology of Fascism*, in which Reich was merciless in attacking Hitler and the Nazis. And he hits home with pungent personal observations about Hitler, such as this one: 'He assures us that only once in his life did he cry' when his mother died.'<sup>12</sup> Such critical observations about the Führer would have enraged the Nazis, for Hitler was meant to be the ultimate superman, capable of feeling and sharing all the emotions of his people (*volk*).

To make things worse for himself, in 1946 Reich's Orgone Institute Press published an English translation of that provocative book, which until then had been available only in German, though most copies had been destroyed by Himmler. It was effectively a public slap in the face to Allen Dulles and



his friends, and to their entire policy of bringing large numbers of SS officers to America and putting them into positions of power and influence at the heart of the American security establishment.

In fact, in June of 1946, Dulles went further and helped to arrange for the Eastern Europe and Russia wing of the Nazi security apparatus to be transferred lock, stock and barrel under its leader Lieutenant General Reinhard Gehlen (1902–1979) into a spy organization called ‘the Gehlen Org’ funded by the United States and ostensibly under American control, which was absorbed into the CIA following the CIA’s formation in 1947.

With all this going on, Wilhelm Reich was considered a very dangerous enemy, lest the American public come to know that the Nazis now secretly composed the entire Eastern wing of America’s foreign spy service, not to mention all those many Nazis who were being brought to America to work on American soil in the most secret projects such as mind control, and of course in the development of rockets and missiles.

But burning Reich’s books was not all. Reich was committed to prison and mysteriously died there not long before he was due to apply for parole and be released. There are suspicions that he was murdered to shut him up. But the most important thing of all which happened was that his most important secret research papers were seized by the FBI and ‘disappeared’. And that brings us back to Freeman Cope’s five articles.

After studying the articles carefully, reading between the lines of what Cope says, and knowing something of how the weird scientific branches of the security agencies operate, it became obvious to me (and it must have been obvious at the time to others) that the FBI had given all of Reich’s seized papers to the Office of Naval Research in the 1950s for evaluation and safe-keeping. And that is what brought Freeman Cope to his own discoveries, partly based, as he freely admits, upon Reich’s researches. After all, how else would he have known so much about the scientific aspects of Reich’s researches, not all of which had ever been made public by Reich?

The Naval agency must have selected Cope, who worked for them, to do some work on Reich’s papers because he himself had recently discovered strange forms of energy within the body, by suggesting that superconductivity took place along the double-helix of the DNA molecule and used organic ‘Josephson junctions’ (named after their discoverer Brian

Josephson, who received the Nobel Prize for Physics for their discovery) These junctions use the weird quantum tunnelling effect, mentioned earlier, in order to control and modify the flow of currents, sometimes in surprising ways; we will return to this subject to discuss them in Chapter 14.

Cope's superiors must have thought him well equipped for having another look at Reich's strange files and papers. I might add that all my attempts to contact former colleagues of Cope to learn more about him have met with total silence, which tells me that these colleagues are bound by secrecy agreements and are terrified to say anything at all <sup>13</sup>

That is the background. Now for the discoveries

Cope came to the conclusion that each of us is surrounded by yet another invisible cloud He describes it as 'a gas of electromagnetic (EH) dipoles.' (A dipole is so called because it has two electromagnetic poles, a north pole and a south pole A dipole may be a molecule or some other object that has both poles ) He believes this cloud can be detected on rare occasions by sensitive persons, who tend to call it an 'aura' Cope stresses that he wished to investigate this by sweeping away mystical theories and tackling the matter purely scientifically.

Cope had no knowledge of the microbial clouds that I have described above, and which would not be discovered until thirty-four years after his death Nor was he knowledgeable about microscopic dust, whether charged or uncharged, and nor was he apparently knowledgeable about plasma either, except in the sense that he may have known about Reich's researches into something that seemed a lot like plasma. That means, of course, that he was also not familiar with the prevalence of dust in plasma, and all the phenomena associated with that. What he discovered was therefore something entirely extra, though the two phenomena may well be intimately related.

He says: '... it is proposed that in the universe around us exist a large number of particles each of which is both an electric and a magnetic dipole.'<sup>14</sup>

Apart from Wilhelm Reich's unexplained findings, Cope's initial stimulus appears to have come from the work over several decades by Alexandre Rothen of the Rockefeller University Rothen had also been researching a strange phenomenon since 1942; he had been working with

proteins, and he had discovered that molecules could in certain circumstances interact with molecules on the other side of a layer of fat, which should have been completely impenetrable to them. Proteins tend to be spherical, and he started spreading them on the surface of water and discovered that they more or less collapsed and went flat. Normally, by being flattened, they could not have been expected to be capable of interacting with antibodies from the bloodstream.

He laid a layer of beef fat (stearite) across them and proved that it was impermeable to any kind of direct diffusion of molecules across it. But he then noticed that the flattened proteins were interacting with antibodies laid on top of the fat anyway, with which they could have no conceivable form of direct contact. It must be stressed that according to conventional thinking, any form of interaction between these molecules other than direct contact was deemed to be impossible. This was when Rothen discovered mysterious 'action at a distance', previously only observed in the realm of quantum mechanics, operating inside organisms in the everyday realm and having a material effect.

Otherwise known as quantum entanglement, this action at a distance, which Einstein (1879–1955) famously called 'spooky', is the puzzling way that pairs of particles can seem to interact even if they are separated in space – indeed even if they are light years apart.

As result of this astonishing finding, Rothen began an immensely long series of careful experiments, and he was still working to try to solve this mystery in the 1970s. Cope not only drew upon articles published by Rothen between 1971 and 1976, he was also in touch directly with Rothen and received a copy from him of an article that had not yet been published, entitled 'Influence of metallic shields on presumably cosmic radiation . . .' Rothen had discovered that there was something else peculiar going on, and it concerned insufficiently understood electric and magnetic phenomena, and some strange form of cosmic radiation, which was also capable of having material effects over large distances.

One needs to recall that Wilhelm Reich had also been concerned with some strange form of cosmic radiation. Cope wondered whether what Reich had looked at and what Rothen was looking at might be the same thing. In going back through even older studies, Cope became intrigued by the meticulously documented and lengthy experiments carried out in the mid-

nineteenth century by Baron Karl von Reichenbach, whose extremely large book *Researches on Magnetism, Electricity, Heat, Light* .. had been translated into English and published as long ago as 1850.<sup>15</sup> Reichenbach's work was at one time fairly well known, but it had been regarded as antique and of little relevance for nearly a century when Cope rediscovered it. He believed it contained much valuable information

Reichenbach reported that many individuals whom he tested insisted that they could see faint auras around the poles of magnets as well as around people's heads. But Reichenbach was led to formulate a concept of what he called 'odic force', to refer to some unknown energy that was involved. Reichenbach's 'odic force' seemed to Cope to be similar to Reich's 'orgone energy' Reichenbach did not however discuss the forbidden subject of sex, as sex did not yet exist in 1850, it seems.<sup>16</sup>

Cope also discovered that Rothen was moving on from his discovery of weird quantum effects in proteins to building electronic devices that would duplicate them. He comments on Rothen's experiments, and the type of particles forming the body-clouds suggested by his findings:

Rothen's magnetic electrode experiments seem to require that it [the type of particle suggested by Rothen] be a magnetic particle, which suggests the possibility that it is a magnetic (H) monopole [a particle having a single pole, not two, as with dipoles] However, H-monopoles have never (with one controversial exception) been observed experimentally despite careful searches .<sup>17</sup>

Discouraged at the unlikelihood of single-poled 'magnetic monopoles' really existing, Cope fell back on the dipoles that I mentioned a moment ago (any magnetic object will normally have a 'north' and a 'south' pole, which is to say 'di' or two poles) and suggested them instead

Well, since Cope's day, magnetic monopoles have come back, and as we are about to see, they are fantastically important and wide-ranging in their implications, and so worth taking the time to understand.

The famous Nobel Prize-winning physicist Paul Dirac had predicted the existence of magnetic monopoles in 1931 and published the quantum physics equations that 'showed' it <sup>18</sup> His arguments are very convincing In 1948, he published an expanded version of this theory, which has been largely ignored, though it has the potential to revolutionize much of contemporary physics <sup>19</sup> In this paper he introduces the idea of a 'quantum

string’ (See my extracts from this brilliant paper and my comments on its radical ideas in the footnote.)

On 30 January 2014, Des McMorrow and Steve Bramwell of the London Centre for Nanotechnology announced their proof of the existence of these monopoles. On 4 September 2015, scientists of the Universitat Autònoma de Barcelona in Spain announced that they had actually produced magnetic monopoles.

Then Georges Lochak, President of the Fondation Louis de Broglie in Paris, and the German physicist Harald Stumpf, a former student of Werner Heisenberg, published a remarkable book in 2015 that revives magnetic monopoles, and contains a veritable tsunami of horribly complex mathematics, a whole book full in fact, to back it up.<sup>20</sup> Indeed, I proofread Georges Lochak’s contribution for him to improve the English, as English is only his third language, his first being Russian and his second being French.

Steve Bramwell has stated: ‘We have observed monopole currents analogous to electricity.’ He also agrees that it should eventually be possible to harness monopole currents for technology, though that is a long way off.

The evidence for the existence of magnetic monopoles keeps piling up, and many physicists are now talking increasingly about magnetic monopole plasmas. This is very important for us, because it means that there may be portions of the Kordylewski Clouds that are plasmas which are not made of charged particles, but instead of magnetic monopoles. In July of 2019, a paper appeared in *Nature* reporting experiments that appear to have confirmed the existence of magnetic monopole plasmas.<sup>21</sup> It referred to numerous other investigators, papers, findings and theories about this subject.

This paper reported the results of investigations with a superconducting device known as a SQUID, to investigate whether the ‘noise’ that magnetic monopoles would make according to theory really exists. They found it and said: ‘Intriguingly ... magnetic monopole flux noise amplified by SQUID is audible to humans.’

They say of their findings that they are ‘consistent with other studies that imply that  $\text{Dy}_2\text{Ti}_2$  and  $\text{HO}_2\text{Ti}_2\text{O}_7$  [Dysprosium dioxide, titanium dioxide: Dy is the rare-earth chemical element Dysprosium that is never found in

nature, but when produced in the lab is known for its high magnetic strength;  $\text{Ti}_2$  is titanium dioxide;  $\text{HO}_2$  is hydrogen superoxide; and  $\text{O}_7$  is an anion of oxygen and in combination means heptoxide] contain a plasma of emergent magnetic monopoles ' And they cite nine references to other papers from *Nature*, the *Physical Review*, and so on.

A 2016 paper they cite discussed both positive and negative magnetic monopoles, which would be the magnetic equivalents of electrons and protons. In other words, there may be a whole other science of plasma taking shape, which verifies the 1979 predictions of Freeman Cope, though he is forgotten.

Let us pause briefly to consider why this is so significant. Scientists expect their theories to be symmetrical and for the most part symmetries are a good sign that your theory may be on the right lines. The established theory of electromagnetism, called the Maxwell-Heaviside Equations (named after the two scientists who formulated them), has a symmetry when it comes to fields: there are both magnetic fields and electric fields. But there is no symmetry when it comes to currents. There are electric currents, but apparently no magnetic currents.

In order to complete the symmetry and for there to be magnetic currents, there would need to be magnetic particles which, like electrons, the particles of electricity, have a charge operating in a single direction. But all magnetized particles known about operate in equal and opposite directions, which is to say they have two poles, one negative and one positive. Therefore, in standard physics there is no such thing as a magnetic monopole.

The quest to discover them has been called the Holy Grail of physics, because not only would this give symmetry to the theory of electromagnetism: with gravity the most important formative factor in the Universe: it would open up a vast new dimension of theoretical physics when it comes to exploring the fields that give our Universe the form it has.

As for the practical implications and how to harness the power of magnetic monopoles; well, that was what Cope was interested in discovering in his top secret work.

In what I will now quote from Cope, we must remember that according to standard scientific symbol protocol, H stands for magnetic and E stands

for electric. Also, we must mentally re-insert the monopoles back into Cope's argument, and consider them as well as the dipoles he discusses. Also, Cope uses the polite phrase 'our unknown something' to refer to the strange phenomenon, and he has coined a wonderful phrase, 'magnet auras' to describe the clouds around magnets visible to some people.

Cope says:

the observation that our unknown something seems to collect near surfaces of magnets (magnet auras) suggests that we may indeed have H-dipoles [remembering that 'H' means magnetic, he means magnetic dipole particles, but we can now add also H-monopoles], which are pulled into regions of high magnetic field gradient, e g , regions near magnet surfaces

In other words, since it is known that Cope's 'unknown something' accumulates near magnet surfaces, he reasons that the 'unknown something' must be composed of magnetic particles. He assumes that they would have two poles, north and south. But since his death, magnetic monopoles having been confirmed, we may add that they might just as well have only one pole and hence be monopoles, as he had initially hoped.

He continues, expanding his comments from magnetic (H) particles to electric (E) ones:

Our unknown something seems also to collect near the surface of the human body (human auras) No magnetic field gradients exist there ('Gradient' in this paragraph refers to a flow of energy either magnetic or electrical.) However, if our H-dipole is also an electric (E) dipole, it would collect also at regions of high electric gradients. The human body forms an electric discontinuity with the electric field around the Earth, thus causing large electric gradients near the body surface. Therefore E-dipoles should collect there

In other words, since human bodies have electric fields around them, forming 'bubbles' within the normal electric field on the Earth's surface (see a drawing of a human standing in such an electric field bubble in Chapter 17, Figure 32, [here](#)), Cope's particles would collect there

Cope goes on to explain how these new insights mean that Wilhelm Reich's supposedly crazy 'orgone accumulators' might really have worked. After explaining how a sandwich of dissimilar materials arranged in a certain way – perhaps not unlike the layers in Rothen's original experiments – might be able to trap such particles, he makes this explicit statement:

Because of this effect, a box made of two layers of dissimilar materials might accumulate and concentrate EH-dipoles from a surrounding gas of FH-dipoles, analogous to the experimental

He adds:

Reich seemed to observe accumulation of some sort of solar radiation [remember I said earlier that Reich believed his orgone energy was being streamed from the Sun to the Earth] with physiological activity within bilayer boxes (sheet iron covered by cellulose) — we may expect bilayer structures to act as diodes or rectifiers (both are devices that conduct a current in one direction) for EH-dipoles. A box constructed from such bilayer sheets might therefore operate as an EH-dipole accumulator, which would explain some of the phenomena observed by Reich <sup>23</sup>

This is an astonishing revelation. Reich was sent to prison for making orgone accumulator boxes of exactly this kind, which he insisted were trapping some unknown solar energy that he named ‘orgone’. Here we have Cope, twenty-three years after Reich’s death, and obviously entrusted by the American security establishment with evaluating Reich’s research papers, concluding that Reich’s orgone accumulators probably worked after all, and paving the way for these to be understood in terms of magnetic monopoles that have since been shown to exist. Cope is talking about reconstructing the very same boxes that were chopped to pieces with axes in front of Reich’s eyes by FBI men outside his house, and their constituent parts thrown onto a fire with his books.

It is beginning to look as if Wilhelm Reich may have been a twentieth-century Giordano Bruno. What kind of mad frenzy possessed the FBI men to behave like this? As I’ve already mentioned, Reich’s books had previously been burned by Himmler’s SS and then they were burned again by fanatical opponents of his scientific findings within the American Government.

At this point in his account, Cope begins to refer to the work of another brilliant scientist who seriously challenged orthodoxy, Herbert Charles Corben. In his ‘day job’, Corben was one of the world’s leading experts on spinning particles, who wrote the definitive book on the subject for that time in 1968, which is so heavily mathematical that you need swamp boots to wade through it <sup>24</sup> But when left free for his thoughts to roam, Corben was an astonishingly bold thinker, as we see in a rather visionary article that was published in 1978, from which Cope draws.<sup>25</sup> Cope and Corben were also in personal touch and exchanged information privately, as Cope makes clear.



Anyone who thinks that monopoles and 'orgone' energies are 'way out' phenomena will perhaps be surprised to hear that the subject of tachyons is even more so. And Corben seriously investigated tachyons, along with a small number of like-minded scientists. What are tachyons? They are particles that travel faster than the speed of light and they are predicted by relativity theory. 'What?' you may exclaim. 'But surely it is relativity theory that says that nothing can go faster than the speed of light?' Well, not really . . . But if we get into the speed of light, then this book will become twice as long, and we cannot allow that to happen.

A tachyon, like the magnetic monopole, is a particle that exists in theory, but is in practice a very rare bird, which most scientists would probably say does not exist in the real world. Before we get too sceptical, we should remember the way physics evolves. It often happens, and happened in the case of the Higgs boson, for example, that a particle is shown to exist in theory many years before it is actually verified by experiment.

So I will have to ask you to swallow hard and try to take my word for it, that tachyons may turn out, as magnetic monopoles have now done, to exist after all, despite a chorus of doubters shouting 'crazy!' The moral to this story is: When someone shouts 'crazy' at you, put your fingers in your ears and carry on.

Drawing upon discussions with Corben, Cope was able to expand his theory of clouds of dipoles surrounding the human body and suggest that clouds of EH-monopoles might actually be tachyons. This would mean that even the laziest person on earth, the teenager who sleeps all day for instance, may at all times be surrounded by a cloud of particles going faster than the speed of light. So when an exasperated mother shouts at her teenage son, 'Get out of bed, it's the middle of the afternoon!', he might justifiably call back to her, 'I'm completely exhausted because my body-cloud has been going faster than light all night long.'

Without going into all the technical details, fascinating as they are, I shall give some of the conclusions that Cope comes to on the basis of all of this. He and Corben worked out together that diffraction patterns [interference patterns of waves that can tell you the frequencies of the waves] of tachyons could create 'certain resonance interactions or standing wave patterns of interactions between the tachyons and crystals'.<sup>26</sup> (Remember what I said

earlier about solitons and standing waves? To explain resonance interactions, which can create standing waves, would require too lengthy an account. But when wishing to understand resonance, think of music, and harmonious chords as opposed to those that are not. The most harmonious chords are called fifths by musicians, and are examples of harmonious resonance.)

Cope is saying here that if tachyons do exist, their rhythmic interactions would naturally make them resonate with crystalline structures in intimate and interesting ways. This is a wonderful vision and a joy to conceptualize. Critics may say it is highly speculative, but Cope found a way to describe the relationship between crystals and mysterious energies in scientific terms. He found a scientific language for it.

Cope goes further. He comes up with mechanisms in the form of 'superconductive regions' to explain how these particles might be trapped within the body. (Again, superconductivity is when electricity travels without resistance.) He also suggests that on the planetary scale, these phenomena could create a standing energy grid, a vast grid system of resonant standing waves of 'earth energy'.

He adds as a footnote that this could explain dowsing, if we all have these particles inside us rendering some people hypersensitive to invisible energy fields. In relation to dowsing, returning to the subject of magnetic monopoles, Cope says:

My hypothesis is that the long sought magnetic monopoles are all around us, and are in the form of delocalized tachyon (faster-than-light particles) clouds, which form periodic wave functions detectable by sensitive quantum mechanical processes in man. The general pattern of reported experimental observations seems to suggest that delocalized clouds (wave-functions) of tachyon magnetoelectric monopole polymers (substances made up of large molecules) surround all solid and liquid objects, and that these are detectable by sensitive persons trained in dowsing techniques. The detection is presumably by quantum mechanical interactions with living cells.

Dirac monopoles exist as large, delocalized, polymeric clouds (or wave-functions) with spatial periodicities ...<sup>27</sup>

I realize that this is very technical language and probably confusing. But what he is saying is that there are these clouds surrounding each and every one of us, and indeed not just us but 'all liquid and solid objects'. Thus, we are all surrounded not only by charged dust and microbes, but by even smaller electromagnetic particles, which are whizzing round us constantly.

faster than the speed of light and causing effects that we have not yet even begun to explore or explain.

And in this connection, I should add that bees and flowers also have an electromagnetic dimension. For scientists at the University of Bristol have proved that bees when flying around are positively charged, and sense the flowers that are negatively charged, using specially sensitive small hairs on their faces.<sup>28</sup> The pollen that they gather also becomes charged, and then the charged dust is scattered in the air by the bees rustling around inside the flowers. We may thus look upon bees and flowers as engaged in a continuous orgy of charged intercourse with one another, generating and displaying their auras and creating plenty of charged dust in miniature clouds as they do so.

It really is true to say we live in an electromagnetic world, and are only beginning to understand how it works. All of us are electric people, full of multiple currents of both negative charge, called electricity, and positive charge, called proticity. Since charged currents always generate magnetic fields, we are also all full of multiple magnetic fields. When we say that people sometimes have 'magnetic personalities', we may be closer to the truth than we thought.

*Electric People*

I have known many distinguished scientists over several decades and had opportunities to sit around discussing these issues with many of them, often for hours, and sometimes for days. The first scientific Nobel laureate I met, aged eighteen, was Paul Dirac (1902–1984), who won the Nobel Prize for Physics as long ago as 1933. I went to tea with him in his rooms at Cambridge and spent four hours with him. He was a great admirer of tea time and made quite a fuss of it, pouring tea and serving dainty little sandwiches, small tarts and cakes.

Dirac was very solitary and silent and rarely talked to people. I seem always to have had a way of getting such people to chat; in Dirac's case, I instinctively knew that I must sit in my chair at a 60-degree angle from him so that he could talk 'without being observed'. He had in fact put the chair there and I knew that its angle was the key to having a conversation with him, as he could not talk to people comfortably if they were looking directly at him face on.

Dirac shyly confessed to me that he was far more interested in biology than he was in physics, but he said he did not dare to tell anybody that in Cambridge Dirac did not accept physics as it was at that time. He complained that no one would listen to him about quaternions (a number system that he believed essential for understanding quantum mechanics, but which his contemporaries insisted had no practical applications), and he thought physics was in many ways on the wrong track. This had a big impact on me, for there I was in conversation with a living legend of science, and he criticized the very foundations of the science of his time and even preferred a different scientific discipline from his own because it was more lively.

That was an early encouragement to my own scepticism about anything and everything that 'everybody believes' I have an inclination to think that 'everybody' is always wrong We discovered that we had both entered university at the age of sixteen, and we talked about that and how it teaches one to be a bit isolated from one's contemporaries, because they are not really contemporaries chronologically at all, but already well on the way towards becoming ossified and rigid. I have written a long account of that interesting meeting, which perhaps I shall publish one day.

Dirac was one of the few scientists who have had the courage to speak of these uncertainties openly like my hero Percy W. Bridgman did in his books Bridgman had won his Nobel Prize in 1946, he had been a famous Harvard professor for decades, and he did not give a damn if querulous and timid colleagues decided to turn on him, savage him, and call him crazy because he was pointing out that not only one emperor, but many wore no clothes. Bridgman was that most honest of persons: someone who is not afraid to admit that he does not know things. He admitted that he did not know what 'a field' actually was, but he went further and said that no one did.

My old friend David Bohm is well known for formulating his alternative interpretation of quantum mechanics, which involves something that he called 'the quantum potential'. When I asked him what the quantum potential actually was, he said he did not know, and that no one really knew what any of the potentials in science were He had come up with the ideas mathematically and hoped one day to find out what it was, but meanwhile it was just there in the equations and he could describe what it did, but not explain what it was.

It is heartening to know that there are some famous physicists who have courage But if you have courage in life you will suffer, because the herd will attack you. Most of my scientist friends or good acquaintances, many of them very famous indeed, have been at heart renegades. What does it mean to be a renegade? It means that you use your own brain rather than the herd's brain

I befriended David Bohm in 1982 when he was Professor of Theoretical Physics at Birkbeck College London. The reason I mention David at this point is because I want to quote from my own article. These are words of

his that come from the voluminous sound tapes which I made with him over the course of many meetings:

What is an electric field? We don't know. If we knew, we would know why field and charge are connected in the particular way in which they are. . . . when I was a child people would say 'Electricity is very mysterious.' Now we say it's not so mysterious, but still nobody knows what electric force really is. We're used to it, that's all, by giving it a name and getting used to handling it. . . . What is a gravitational potential, what is an electrical potential, what is a quantum potential? You see, you would have to explain all the forces and explain why they act on particles. Now, nobody has done that.<sup>1</sup>

The non-scientist may be astounded to hear this confession from one of the most famous physicists of the twentieth century, but many of the most brilliant scientists have expressed these and similar sentiments not only in private, but in many articles and books. One example was my close friend, Peter Mitchell, of proticity and the protic motor ([here](#)), who insisted to me many times that 'nobody knows what energy really is'. And the famous physicist Richard Feynman (1918–1988) was honest about our ignorance. He bluntly said, 'I think I can safely say that nobody understands quantum mechanics ...'<sup>2</sup>

And elsewhere he made statements such as these:

Whether the proton decays or not is not known. To prove that it does not decay is very difficult. . . . there are quantum theories of gravity. . . . (but) . . . there is no way to test them. . . . The best of these theories is not able to include the particles that we do find, and invents a lot of particles that we don't find. . . . there remains one especially unsatisfactory feature, the observed masses of the particles,  $m$ . There is no theory that adequately explains these numbers. We use the numbers in all our theories, but we don't understand them. . . . what they are, or where they come from.<sup>3</sup>

Nobel laureate Ilya Prigogine, whose work was discussed in Chapter 3, said:

I think we are only at the beginning of science. We are at the beginning of studying the complexity of Nature. The classical universe was a simple, quiet universe. And now we see, we only conceive the extraordinary complexity of nature, like for example the complexity of the gene expression. We still don't understand completely the structure of the gene. Yet I don't think that once we understand the structure of the gene we shall see the meaning of man, because the genetic content of a mouse and a man are very similar. Therefore the non-genetic part of biology is very important. But we know little about it. . . . In addition I would say there is no fundamental science. . . . why do we have so many elementary particles? Nobody knows. . . . we still don't know the origin of the Universe. The theory of the Big Bang is the most widely accepted theory, but what is the Big Bang? . . . We are at the beginning. I always say that we are at the beginning of a new science, not at the end of science.<sup>4</sup>

So now we come to another remarkable man and great scientist, Albert Szent-Györgyi (1893–1986), who became a great influence on many pioneers in this field, and with his contemporaries Alfvén, Bostick, Kapitsa and Cope, one of the great heroes of the history of plasma. He was a Hungarian whose surname means Saint George and is pronounced just like ‘Saint Georgie’. He was the second scientific Nobel laureate whom I met, when I was twenty-one. He won the Nobel Prize for Physiology and Medicine in 1937 when he was still Professor of Medical and Organic Chemistry at the University of Szeged in Hungary.

By the time I met him, he was an exile living in America, whither he had fled in 1947 from the Communist regime of his native country, and he was working at the Marine Biology Lab of the Woods Hole Institute on the coast of Massachusetts, where I visited him for an afternoon.

Things had not gone happily for him in Hungary during the Second World War because of the Nazis. He had led a resistance movement against them and saved many Jews from being killed, and was lucky not to have been captured, tortured and killed by the Gestapo himself. The Hungarian Prime Minister sent him to Cairo to negotiate secretly with the Allies, and Hitler personally issued a warrant for his arrest. Szent-Györgyi was a larger-than-life extrovert character, with a ravaged face, a good sense of both humour and sarcasm, and someone who was not shy when it came to letting his genius glitter in conversation.

What is important for our story is that it was Szent-Györgyi who laid the true scientific foundations for the electric view of humans (and of all plants and animals also, for that matter). It is not for nothing that his most famous and provocative books are *Bioenergetics* (1957) and *Bioelectronics* (1968). I met with him in the summer of 1966, before the latter book was published. In 1976, he carried his views further and published *Electronic Biology and Cancer*. He believed that cancer was a condition associated with electrical and electronic malfunctions within the body.

Szent-Györgyi’s *Bioenergetics* is such an amazingly provocative, challenging and brilliant book that its full effect has not been felt even today, for it contains insights that have yet to be pursued. It is a bombshell still going off, even though it appeared three-quarters of a century ago. I don’t imagine any physicist read it at the time, because it is so heavily technical about biochemistry that few if any physicists could have

understood most of it. It was published before the discipline now called biophysics came into being. In fact, it was Szent-Györgyi who helped to provide the impetus for the founding of the science of biophysics, by injecting discussions of physics into biochemistry to such an extent that biochemists were forced to learn some physics in order to comprehend what he was telling them

Indeed, Szent-Györgyi in his 1976 book *Electronic Biology and Cancer* based a portion of his arguments upon the work done by the famous French physicist Léon Brillouin (1889–1969), thereby forcing any of his colleagues who wished to understand him to study Brillouin's unique discoveries about electrons and the energy levels named 'Brillouin Zones' after him.<sup>5</sup> Brillouin had been insisting that semiconductors existed inside the body. Also, Szent-Györgyi had referred to Percy Bridgman's seminal book *The Physics of High Pressure* (1949), forcing his colleagues to read Bridgman in order to understand one of Szent-Györgyi's most important ideas.

For more than twenty years, Szent-Györgyi had been relentlessly pushing physics into biology, and it was becoming impossible to ignore this, so that the discipline of biophysics had to be born to cope with it.

He remarked in his 1957 book *Bioenergetics*:

Experimental evidence for the existence of a semiconductor [semiconductors are necessary for the ordered flow of electricity] nature of biological material is not missing — chloroplasts [the tiny organelles inside plants that carry out the process of photosynthesis] can 'store light', that is, conserve the energy of absorbed photons, which energy they could again shoot out later in the form of light, if heated — That energy can move through protein molecules is an experimental fact — I have no doubts that the coming century will witness a profound revolution, extension of biology, the establishment of a quantum mechanical biochemistry

This book may be but one of the early swallows of this spring<sup>6</sup>

We will see later that the quantum mechanical qualities of plasma, some of which we have already touched on, are crucial for understanding its role in the evolution of high levels of intelligence.

*Bioenergetics* was indeed an early swallow, and an influential one. It may have gone unread by many people, but they knew it was there, lurking. It is immediately obvious, if one thinks about it, that Albert Szent-Györgyi was an outstanding genius who was denied proper recognition in the United States; he discovered Vitamin C and won the Nobel Prize, but was he ever offered a professorship in America? No! Was he ever head-hunted by one of



the Ivy League universities? No! Did the Institute of Advanced Studies at Princeton ever try to recruit him? No! Was he ever awarded any of the usual distinctions? No!

Instead, he took refuge in an oceanographic institute, which is what Woods Hole is. And he was given a job in a Marine Biological Laboratory. What on earth did Szent-Györgyi have to do with fish? Pretty much nothing. In fact, he was relegated eventually to something called the Institute for Muscle Research. It is true that he had done a lot of research on muscle and was one of the world's experts on the subject. But for him, that was a sideline. What was really going on was that the American scientific establishment was clearly afraid of Szent-Györgyi, wished to exclude him from the mainstream, and tried to prevent him upsetting all of their empty apple carts. And the appearance of *Bioenergetics*, throwing a bomb into the middle of all of conventional biological thinking, did nothing to render him less dangerous to the mediocre minds of the establishment figures.

With his book *Bioelectronics* (1968), Szent-Györgyi became even more of a threat to standard thinking. The first two sentences in his book are:

The greatest stride in biology, in our century, was its shift to the molecular dimension. The next will be its shift towards the submolecular, electronic dimension.<sup>7</sup>

He went on to speak of plasma existing in every molecule in the body, saying each molecule contains something that 'can be looked upon as an electron gas pervading the whole molecule'.<sup>8</sup> An electron gas is a negatively charged plasma [negatively charged because electrons always have a negative charge, being distinct from the ionized, positively charged plasmas we have, for the most part, been discussing]. Publishing something like this, insisting that there was a branch of biology that was electronic, that every cell in the body was electronic, and that every molecule contained plasma, was too much for the scientific establishment. Most biologists did not have the faintest idea how electronics worked even in a radio, much less in a molecule.

The more Szent-Györgyi published things that required people to stretch their minds, asking biologists to learn a little bit about physics and a little bit about electronics, the more certain it became that he would never be accepted or recognized in America. He could not go back to Hungary,

because he would probably have been arrested, tortured and shot. He was also not in favour with the American security establishment, because he had led an anti-Nazi movement, whereas America in the 1950s and 1960s was being flooded with ex-Nazi scientists being brought over by Allen Dulles of the CIA as part of Operation Paperclip and other such projects

But worst of all for Szent-Györgyi was the fact that Hitler's personal hypnotist, Ferenc Völgyesi, who had carried out hypnotic experiments on more than 60,000 Jews and Gypsies in the death camps, had become Allen Dulles's little darling, given a new identity as 'Frank', treated as an American, and put in charge of all the American security establishment's mind-control operations. And he was Hungarian.

Völgyesi was clearly going to use his influence with Dulles to prevent a distinguished anti-Nazi Hungarian from gaining any recognition at all in America, lest Szent-Györgyi might spill the beans on Völgyesi being a war criminal and a fanatical Nazi responsible for the abuse, torture, and deaths of thousands of Jews. And the CIA must have gone into full gear to keep Szent-Györgyi as obscure as possible, hidden away in his little port on the Massachusetts coast and buried in harmless muscle research, given no attention, and having no opportunity to acquire an audience who might ever listen to him.

Szent-Györgyi was in any case handicapped by terrible personal grief, because both his wife and his daughter had died of cancer by 1972, when he dedicated his book *The Living State With Observations on Cancer* to their memory, saying in his Introduction that cancer 'took away most of what was dear to me'. And in his Preface, he thanked those few people who had 'helped to keep me "above water"'.<sup>9</sup>

A brief but fascinating account of a conversation with Szent-Györgyi has been published in Andrew Marino's autobiography. They met in San Francisco in June of 1980 (Szent-Györgyi died in 1986). Szent-Györgyi complained bitterly to Marino that he had never been able to get any federal grants for his research during his years in America, confirming my suspicion that he was blacklisted by the security agencies to make sure he never received any support for anything at all.<sup>10</sup>

Despite all this, Albert Szent-Györgyi laid the groundwork for crucial discoveries and developments in science, by helping to create the discipline

of biophysics and introducing so many new and exciting notions that are still being explored today. For instance, he is looked upon as the ‘grandfather of biophoton research’, a subject I will be discussing in Chapter 15. He describes how ‘ultra-weak’ photons are emitted by the body; which, when their emission is correctly detected, has enormous implications for the early detection of diseases, especially cancer

He also laid the groundwork for much of Peter Mitchell’s work, turning upside down the discipline of bioenergetics and the explanation of how energy is used within the human body, and explaining how energy is transported across membranes and used in cells. But the main point of all this for us here is that the details of what Szent-Györgyi says in his books relate directly to the nature, structure and workings of intelligent plasma entities.

In *Bioenergetics*, Szent-Györgyi refers to the fact there are several different kinds of ice. This may surprise many people! Surely ice is ice, isn’t it? Well, no, not really. Szent-Györgyi found this information briefly referred to in Percy Bridgman’s *The Physics of High Pressure* (1949) <sup>11</sup> Bridgman was possibly the world’s leading investigator of high-pressure phenomena, and he refers to ‘the high-pressure modification of ice’. With the correct pressure techniques, one could change one form of ice into another. He could change Ice I into Ice III, Ice V, and Ice VI, for instance. All these are ices made of pure water, but they are different water ices.

Research into different ices continues today. In 1998, the number of different kinds of ice increased to twelve, as Lobban, Finney and Kuhs published in *Nature* an account of their discovery of Ice XII. <sup>12</sup> But by 2016, the number of ices had grown to eighteen. Although these different ices are described as ‘crystalline phases of ice’, they vary a great deal. Their oxygen atoms tend to remain in fixed positions relative to each other, but their hydrogen atoms do not. In addition to the eighteen crystalline ices, there are three non-crystalline ices known as amorphous ices. So that makes twenty-one kinds of ice so far, all of them made solely from water.

There is also ‘hair ice’, which exists as thin threads spreading between trees, and ‘ice flowers’, which are produced by some plants but not others. No one knows why.

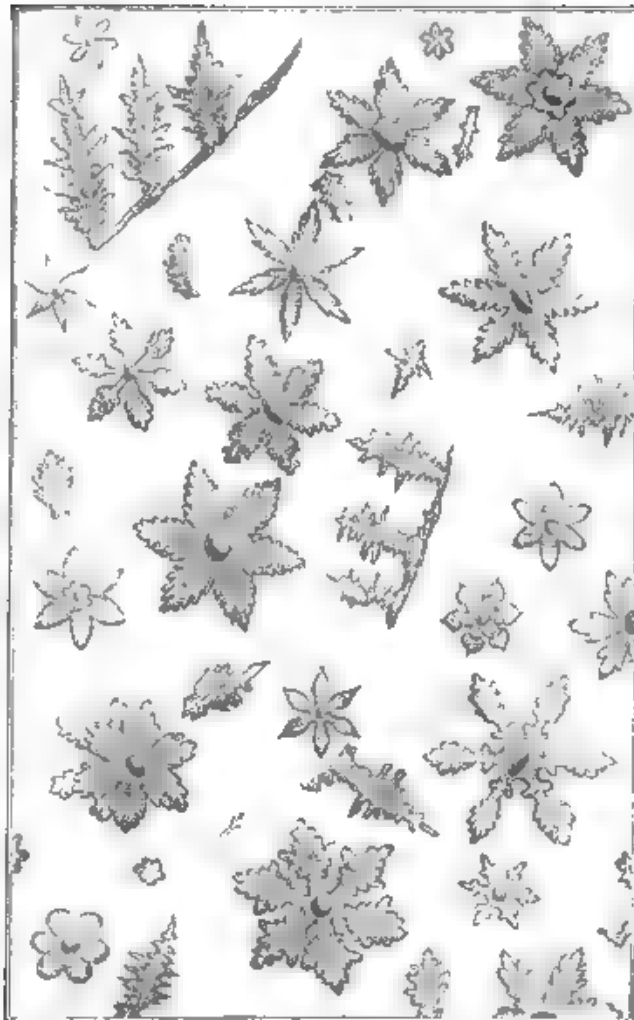


Figure 28, A nineteenth-century engraving of 'ice flowers' as seen through a microscope

Does this mean there are twenty-three kinds of ice? Are there more? What does it mean to have twenty-one kinds of ice? Or twenty-three? Or fewer? Or, frankly, even only two? Are the different ices also different kinds of matter? Or is ice just ice, regardless of which of the eighteen or twenty-one or twenty-three kinds it is?

Crucially it is not only ice that behaves in various strange ways. In *Bioenergetics*, Szent-Györgyi may have caused the greatest upset to his colleagues of all by discussing the weird nature of water. These days there are many books, many of them New Age titles, discussing different kinds of water at great length; they concern such ideas as 'water having memory', to explain how homeopathy is possible (where the dilution of a drug in water is so extreme that not one molecule remains, and yet the water appears to

retain a potency derived from that drug anyway), and many other mind-boggling ideas. But Szent-Györgyi's thoughts on the strangeness of water in 1957 are so extraordinary that I must quote a bit of what he says:

When considering water structures we enter a fantastic and fascinating world. Bridgman, in his studies on high pressure, could distinguish between half a score [ten] of different ices. But we need not go to ice to find structures in water. [J D ] Bernal and [R H ] Fowler showed water to have a quartz-like 'crystalline' structure which is different from that of common ice. The situation becomes more complex still if we consider water structures built around solid surfaces. The tendency of building structure-ordered layers around surfaces running deep into the fluid phase seems to be a general tendency of liquids.

The surface zones of liquids are tens and hundreds of molecules deep, rather than monomolecular, as commonly assumed. Water around ice (behaves) not as water but as 'liquid ice'. These layers of ice were found to be several microns deep. The building of lattices means 'long range order' in which the single molecules collaborate collectively. No attempts have been made yet to apply our knowledge of water structures to living systems. Living matter seems to be a system of water and organic matter, which forms one single inseparable unit, a system, as the cogwheels do in a watch.

Water is not only the mater, mother, it is also the matrix of life on Earth, and biology may have been unsuccessful in understanding the most basic functions because it focused its attention only on the particulate matter, separating it from its two matrices, water and the electromagnetic field.<sup>13</sup>

What is most interesting of all in this for our purposes is that Szent-Györgyi grasped the importance of 'structured-ordered layers around surfaces' within a watery mass (in other words the concept of a mass of water containing protected, or walled, cells within itself, which themselves are made entirely of water). These boundary layers within water are analogous to the boundary layers known as sheaths found within plasmas. All plasmoids are enclosed by sheaths. That is how they maintain their identities.

Szent-Györgyi had a deep intuition of the extraordinarily complex, dynamic structures that inform naturally occurring materials, including ice, water and plasma, but of which science had been ignorant before his discoveries. We have been building complex plasma entities having countless plasmoid regions within them, all protected within their sheaths.

Researchers such as Kapitsa, Bostick and Tsytovich have shown that some of the plasmoids contain hot plasmas, some cold plasmas, some dusty plasmas, some non-dusty voids, some containing specific impurities that hinder or accentuate the flows of charged currents precisely in the manner of electronic semi-conductors and transistors. Furthermore, there is the

mysterious phenomenon called ‘tunnelling’ (to be explained in a moment) that takes place between them, and there are also superconducting and superfluid portions and sections. That water and plasma – which Szent-Györgyi showed to be present throughout human bodies – spontaneously generate structures adds a whole new dimension to the argument.

In order to understand the implications of Szent-Györgyi’s work in more depth and to see how it works in practice, we will look again at superconductivity and Josephson Junctions, before delving back into the weird and shadowy world of Freeman Cope.

### *Superconductivity and Josephson Junctions in the lab, outer space and human beings*

It often happens in the history of science that a new scientific theory will give rise to new inventions. This is quite natural, but sometimes it happens the other way round.

The invention by Brian Josephson of Josephson Junctions as a device to control and regulate electric currents in complex machines helped drive the development of machine intelligence and eventually quantum computers. This in turn gave rise to theories that there might be things in nature that have similar functions

We have already touched on the idea that there might be features in complex dusty plasmas in space which have similar capabilities to computers, and that these may help the evolution of intelligence in space. Now we are going to look at features that resemble Josephson Junctions in plasma in human bodies. We will do this before we actually explain Josephson Junctions.

The story starts in 1911 with the observation of superconductivity in a lab by the Dutch scientist Heike Kamerlingh Onnes. When electricity flows along a wire, it is called electrical conduction. When it flows through something without any resistance at all (an amazing phenomenon that scientists could barely believe when it was first discovered), it is called superconductivity

Superconductivity is entirely counterintuitive. Everything that has traditionally been known about electricity is that it encounters resistance as

it flows along, and as everyone who has ever had anything to do with electronics knows, and every electrician who wires your house, the units of resistance are known as 'ohms', named after the German scientist Georg Ohm (1789–1854).

At first, superconductivity was thought to take place only at extremely low temperatures near Absolute Zero, temperatures so low that in everyday life we never encounter them, because they have to be artificially created by scientists and technicians. But then as time went on, it was discovered that superconductivity could take place at higher and higher temperatures, and it was discovered that current could flow in this manner through increasing numbers of materials, many of them artificial.

As Freeman Cope put it:

Superconduction is the passage of electron current without generation of heat and hence with zero electrical resistance. Such behavior has been observed only in inorganic materials and only at temperatures below approximately 20°K [on the Kelvin scale, it equals minus 253.15 degrees Celsius], although theory predicts that superconduction might occur in organic materials at room temperatures.<sup>14</sup>

When current is flowing by superconductivity, it encounters no resistance at all; it can go on forever. It is, in fact, an electric version of a perpetual motion machine. If flowing in a coil under suitable circumstances, the current goes round and round by itself with no power source and it can in principle do this for eternity. It needs no recharging. It flows like an endless river. In fact, machines creating superconductivity have been made, which all other things being equal will continue to flow beyond the end of the Universe, if the Universe should actually end, that is (which in my opinion it will not).

The next great breakthrough for our purposes came in 1962, when Cambridge physicist Brian Josephson predicted with mathematical precision how a supercurrent would leap over a thin insulating barrier connecting two superconductors by means of the quantum phenomenon called 'quantum tunnelling'.

This precision is key. Josephson realized that by modulating the insulating barrier between the two superconductors, the flow of current could be modified. If electricity flows too strongly and too well, it is too powerful for electronic devices and can overwhelm them. And if it cannot

flow at all (through an insulator), it is obviously of no use whatever. Because of what became known as Josephson Junctions, it became possible to use superconducting electricity that was not too strong, but of semi-strength only, and by varying the semiconductor materials by adding small amounts of this or that substance (what is called 'doping'), the strength of the electric flow could be varied and fine-tuned

These junctions are what make our most advanced modern computers possible, and without semiconductors (the ordinary ones, which had been known for a long time before this and that regulate normal electrical flow very precisely) there would be none of our contemporary electronic devices. There would be no portable computers, no cell phones, no tablets, and hence no internet, and so on.

Josephson was awarded the Nobel Prize for Physics in 1973 for his discoveries. He is another one of the Nobel laureates whom I have met and talked with about their work. He is a very shy and modest fellow, whose success in science came to him so young that he was rather intimidated by it all and for a long time seemed to dread all the attention he received. One day I must transcribe the tapes I made of our conversation.

Josephson Junctions are also fundamental to the development of a quantum computer. Indeed, some scientists go so far as to speak of a 'Josephson Quantum Computer'. Josephson Junctions can now be made at the nano scale, with a thickness of only one tenth of a nanometre. They are able to act as computer switches so sensitive that they control currents one electron at a time, letting an electron through when desired and blocking an electron when necessary. This level of control has already been perfected, and when quantum computers finally come onstream, it will probably be because of the pioneering work and insight of Brian Josephson. For radiation detection purposes, vast arrays of tens of thousands of tiny Josephson Junctions working in synch are capable of obtaining results unobtainable by any other known means.

In a dusty complex plasma that has developed emergent properties of self-organization, where superfluidity is made possible by countless layers of sheaths, cells and crystals, we can expect superconduction and Josephson Junctions to form the basis of the energy flows within the plasmas. A dusty complex plasma such as a Kordylewski Cloud would thus be expected to have more than a trillion trillion trillion Josephson Junctions within it. (Or



just keep adding the zeroes, as they would in effect become incalculable in number )

Intelligent calculations by such conscious plasmas would be so rapid and so massive that a Kordylewski Cloud would easily have the capacity to monitor every living creature on Earth in real time and model future events for all of them. Such a cloud could thus foresee with a high degree of probability what would happen in almost any Earth situation, and have models of every conceivable variable's effect on events. From the point of view of the limited human brain, a Kordylewski Cloud therefore has the capacity of what to us would be indistinguishable from omniscience.

If this complexity is possible in plasmas in space, what about in the human body? We know from Szent-Györgyi's work that the human body contains organic semiconductors. For the achievement of the Josephson Effect within our bodies, these can suffice for the necessary 'barriers' to create the 'jump'. The impetus for the 'jump' can come from something called 'the Proximity Effect'. When two superconducting currents are near enough to each other, they can influence each other because of their proximity, and this can result in a Josephson Effect if there is an organic semiconductor available.

To understand the implications of Szent-Györgyi's discovery in more depth, we need to dive back into the weird world of Freeman Cope. I originally discovered his publications in the mid-1970s, as at that time I was constantly in Oxford doing research, though not living or based in Oxford. I would drive down to Oxford from the cottage where I was living in our little Morris 1000, which had an engine like that of a lawnmower, cold wind whistling in through the soft roof, and a heater so feeble that to avoid freezing in the winter one had to wear a heavy overcoat covering one's legs.

The irony is that I was studying organic superconductivity, which generates no heat because it encounters no resistance. So it would have been of no use when driving.

The journal I had discovered was *Physiological Chemistry and Physics*, published by the Pacific Publishing Company in Portland, Oregon, which is where they were at that time (they are now in Melville, New York). This exciting journal was packed full of astonishing articles and they were causing me to look at the physical body in an entirely new light.

As I looked into this more deeply, I discovered that William A. Little of Stanford University seems to have been the first person to start this chain of reasoning going. As early as the summer of 1964, he had published a paper in the prestigious *Physical Review* entitled 'Possibility of Synthesizing an Organic Superconductor'.<sup>15</sup> He concluded that 'superconductivity should occur even at temperatures well above room temperature' using 'certain organic polymers (substances made up of large molecules with repeating subunits) ... which could have considerable biological significance'. After surveying numerous technical issues, he said: 'This forces upon us the remarkable conclusion that superconductivity could and should occur in structures such as this even at room temperatures.'

These findings tied in with work Cope had been doing since 1963, and he cites in footnotes relevant publications of 1963, 1964, 1970, and 1971, when he published his first major paper making claims of superconductivity in the body, in the 1971 article I cited a moment ago. In this paper, Cope refers to 'electron tunneling', which is the essence of Josephson Junctions

Cope says in his paper:

we may predict ... special characteristics that superconductive biological systems should have, for which pertinent experimental data already exist. First, cells which perform single electron superconductive tunneling might also perform two electron (Josephson) superconductive tunneling [relating to] nerve processes. The apparent association of superconduction with growth which is indicated by the evidence of this paper

The importance of the distinction between single and two electron tunnelling is that the latter are of a higher order when it comes to controlling the flow of currents, and they come into play when Josephson Junctions are used to control superconducting currents. A Josephson Junction, to put it simply, can act as a switch.

The following year, in the same journal, two Hungarian scientists published a paper commenting on Cope's ideas, and concluded:

The ... electron tunneling between the mentioned regions of DNA might be responsible for the experimental facts described by Cope, if we accept his hypothesis about superconductive tunneling in biological systems.<sup>16</sup>

In the spring of 1973, Cope published another paper in the same journal carrying his ideas further.<sup>17</sup> In this paper, Cope said:

Various species of organisms can detect weak magnetic fields (0.1 to 5 Gauss) [Gauss units are a measurement of the field strength]. Indirect evidence suggests that electron tunneling may occur across junctions between superconductive micro-regions in living systems. Man-made superconductive Josephson junctions have been fabricated with magnetic sensitivity as high as  $10^{-11}$  Gauss. It is suggested that superconductive Josephson junctions in living systems may provide a physical mechanism with more than enough sensitivity to explain the observed responses of organisms to weak magnetic fields.

Considering what was said about Cope in Chapter 13, it is interesting to note that at the end of this paper Cope states that his work was ‘supported in part by Office of Naval Research Contract NR 105-717’. Cope had obviously persuaded his military security agency bosses that what he was doing deserved funding. A month later, the same journal received a paper from J.P. Marton extending Cope’s ideas to considerations of cancer, and this appeared in the next issue of the journal. Entitled ‘Conjectures on Superconductivity and Cancer’, the paper by Marton said:

On the assumption that biological cell membranes possess superconductive properties and that dead and cancerous cells do not – the mechanism of control for embryonic, normal, and cancerous tissue growth may be explained.<sup>18</sup>

The next spring, in the same journal, Solomon Goldfein (1914–2003) one of the brightest scientists working for the US Army’s Engineer, Research and Developments Labs in Fort Belvoir, Virginia, contributed to the discussion. Perhaps the Army did not wish to be left behind by the Navy! Goldfein’s paper was entitled ‘Some Evidence for High-Temperature Superconduction in Cholates’ and started his paper by saying:

When [William A.] Little examined [Fritz Wolfgang] London’s idea [of 1937] that superconductivity might occur in organic macromolecules – he concluded that it was not only possible but might even occur at room temperature.<sup>19</sup>

By summer, once again in the same journal, Cope published yet another paper in which he said:

Superconduction is the passage of electron current without generation of heat and hence with zero electrical resistance, accompanied by particular kinds of interactions with magnetic fields. Until recently, such behavior had been observed only in certain metals, and only at temperatures below approximately 20°K. Theorists have long predicted, however, that superconduction might occur in organic solids, which theoretically might superconduct even at room temperatures and above.

Cope was also reporting evidence that some functions of nerves are controlled by superconduction and he proposed that biological sensitivity to weak magnetic fields is comprehensible only in terms of a biological superconductive Josephson Junction. Once again, Cope acknowledges the Office of Naval Research and Contract no. 105-717.

Also in early 1974, Profesor Antoni K. Antonowicz of Poland published an article entitled 'Possible Superconductivity at Room Temperature' in *Nature*.<sup>20</sup> This attracted wider attention and was reported in the *New Scientist* magazine on 28 February 1974, p. 525, beside a report on work by Freeman Cope. Antonowicz was reported as using a sandwich of amorphous (which is to say non-crystalline) carbon between aluminium films to engineer Josephson junctions, and he like Cope discovered that the tunnelling involved was modulated by a magnetic field.

Cope next delivered a paper to a conference in 1978, the abstract only of which was published in the volume of conference Proceedings by the US Department of Energy. He discussed how superconductive Josephson Junctions make it possible for organisms to detect not only weak magnetic fields but also microwaves, and he referred approvingly to the work of Antonowicz.<sup>21</sup> Cope's full paper appears never to have been released for publication.

At this point, Cope's involvement in this subject appears to have ended, and in this same year he switched his work to the dipole clouds that have already been discussed.

No one else has ever done a survey of these publications, and I thought it necessary to put it all on record, as it was an important episode in the history of science. Since this flurry of exciting papers appeared, this subject has mysteriously 'gone quiet' in America. That is often a sign that the security agencies are working on it, or if not working on it, then actively suppressing it for some paranoid reason of their own. (How dangerous can it be for the public to know about superconductivity taking place within the human body?) But several decades of silence is extremely annoying, especially in light of the crucial importance of this almost-forgotten subject.

What does all of this mean for our discussion in this book? It is fundamental. We are looking at the dynamics of currents of electricity and proticity within our bodies, an interface between the plasma inside us and

our physical bodies – and also, as Cope's work suggests, between our plasma selves and universal electromagnetic fields and perhaps microwaves. In other words, Cope discovered a plasma-based mechanism by which our physical bodies are affected by fields.

As we will see later, quantum biologists have shown that some birds navigate their migrations by means of interaction with the Earth's electromagnetic fields, which have now been shown to cause chemical changes in their brains. Could this interface identified by Cope also work in much more subtle and complex ways in the human brain and account for important features of own consciousness and behaviour?

This subject needs to be investigated continuously and relentlessly. Either it has been done in secret, in which case the facts need to be made public, or it has not been done, which would be a major dereliction.

In 1989, an unexpected contribution to this subject appeared from Europe. A group of five authors prominent in biophoton research published a paper supportive of the idea of superconductivity in organisms. They were Emilio Del Giudice, Silvia Doglia, Marziale Milani, Cyril W. Smith, and Giuseppe Vitiello. I have had very friendly and productive relations with Smith and Vitiello for some time by email, but missed the brilliant Emilio Del Giudice, who was no longer alive by the time I established contact. Their joint paper especially dealt with Josephson Junctions in living systems.<sup>22</sup> The five authors were preoccupied by what it means for long-range order to occur by correlated behaviour of the elementary components of an organism.

The five authors say:

A living system can be considered as a set of many microscopic components whose interplay occurs through a network of mutually coupled and sequentially ordered chemical reactions. The macroscopic [large scale] ordering could be considered as emerging from the collective behaviour of the elementary components. One of the authors [Cyril Smith] and his co-workers have, over many years, found evidence that Josephson-like phenomena are occurring in living systems. The first piece of evidence came in 1975 – there is a small superconductive region with dimensions (which are very small). A dispersion of such regions – could give rise to an a.c. [alternating current] Josephson effect – a pair of nearby cells acts as a Josephson Junction (which gives) rise to an intercellular coherence.

In other words, ordered complexity is created in organisms by means of the actions of adjoining cells influencing each other across Josephson

Junctions It was impossible for Freeman Cope to enter this discussion, because he had already been dead for seven years.

However, a year later in 1990, William A. Little jumped back into the fray, twenty-six years after his seminal paper of 1964 considered earlier. As an organizer, he took part in an International Conference on Organic Superconductors, which took place 20–24 May 1990, at South Lake Tahoe, California. This conference was funded by the deceased Freeman Cope's old employers, the Office of Naval Research, under contract N00014-90-J-1384, along with the US Department of Energy.

Bill Little, describing himself as 'Principal Investigator', wrote the necessary classified Final Report for the Navy and submitted it on November 30. This Report has now been declassified. It contains a photo of all the participants and a chart identifying them all by numbers. The papers are not included, but abstracts of them are. Little states that the Proceedings will be published by Plenum Press, and then he says:

It would be appropriate to mention two items which were brought up by the participants and which might be of interest to funding agencies. The first was a perceived need to develop a better understanding of the process of electro-crystallization. The second, was the remark by Professor J. [James] P. Collman that the field of organic conductors, organic magnets, and organic superconductors appears to many to have the potential of contributing an enormous amount to the development of new materials of commercial value in the coming years.

When the Proceedings of this conference were published, containing all the papers,<sup>23</sup> none of these remarks or the photo appeared. In a brief preface about the history of the subject for the preceding twenty-five years, Little does not mention a single one of Cope's papers, or indeed any of the other papers we have considered here except his own of 1964. To me, this gives the appearance of a wish to conceal the earlier history of the subject rather than to reveal and discuss it.

In the large volume, Josephson Junctions are mentioned only once,<sup>24</sup> and the conference as a whole appears to have taken place in a parallel universe where all that we have considered so far does not exist. And after this conference, the entire subject drops off a cliff and that is the end of it, as far as the public gaze is concerned. Perhaps 'the development of new materials of commercial value' (and probably military value as well) was the reason for this subject 'going dark' after 1990. In which case, I am glad to be resurrecting it, since probably no one else would ever have done so.

The mechanics of superconduction within physical bodies will certainly also be found in a similar form in plasma bodies in space. There can be no doubt that superconducting regions and Josephson Junction switches operate within plasma entities, and must occur in their hundreds of millions or billions (or probably trillions) within the Kordylewski Clouds. They will be fundamental to any computing powers of the Kordylewski Clouds. And there must be hundreds of thousands of them within each one of us, in both of our bodies, the physical ones and the plasma ones.

In addition to this, superconductivity is, as we saw in Chapter 8, bound to occur within the Birkeland Currents that stream through the whole of the Universe. There is no reason why such superconductivity within those galactic and inter-galactic filament streams cannot travel at speeds known as 'relativistic', meaning near to the speed of light. As we have also seen, we know the streams of electrons within the Birkeland Currents move forward in a double-spiralling fashion in counter-rotating layers. Similar filaments, operating in the same or a similar fashion, must exist within the Kordylewski Clouds, and at a micro level within ourselves. These are areas of research that need urgently to be pursued, as we need to know so much more.

I shall add just one clue as to why this subject may have been suppressed. Everything that I have described above could be exploited in the creation of robots that combine inorganic with organic components. There are people who write about 'transhumanism', which deals with this subject. The work of Cope and the others, in fact, has direct relevance to efforts to build robotic 'super-soldiers', who can enter a battlefield and kill, kill, kill. Isn't that wonderful?

## *How Our Bodies Emit Light*

All of us emit light, as do all living things. But it is a kind of light that cannot easily be detected. Since particles of light are called photons (a word coined for them in 1916 by the physicist Leonard Thompson Troland), those spontaneously emitted by living tissues have come to be called 'biophotons'.

Biophoton emission is not the same as 'bioluminescence', which is what we see with fireflies, electric fish and a few other creatures. It is also not the same as 'chemiluminescence', light emitted by a chemical reaction, which can also sometimes be seen taking place in living things. All those emissions of light can be seen by the eye. But biophotons cannot.

Biophotons are emitted when electrons in the organism get energized or 'excited'. They are therefore useful for detection and diagnosis, and as indicators of what is happening in the organism.

Biophotons are so faint that they are what is known as 'ultra-weak' emissions of light. If something is ultra-weak, then surely, you might say, it is of no importance. But nothing could be further from the truth. We have good reason to believe that biophotons are fundamental to our existence. And when the emission of biophotons by our bodies goes wrong, it means that we have a serious illness.

It is now known, for example, that changes in biophoton emission rates are the earliest possible sign of cancer. So early is their warning that millions of lives could be saved or significantly extended if a mass biophoton detection programme were adopted. With such extremely early warnings, incipient tumours could be removed before they became dangerous, when they were still only a few cells in size. (Such tiny incipient tumours can easily be zapped and destroyed by ablations, using keyhole



surgery ) Biophoton detection is not invasive and does not require expensive scanners. It does not bombard the body with radiation. It is an entirely passive process. It need cost very little. Indeed, it can be done by a simple blood test.

At the present time, only one machine exists in the world for taking these images. Biophoton research is barely funded and is ignored by all the world's governments except the Dutch, which is strange, considering that cancer prevention at an early stage could save such gigantic sums of public and private money in treating cancers. In fact, the world's medical insurance companies should sponsor mass biophoton detection to increase their business profits enormously.

For a large-scale biophoton scan of, say, half of the body, the person needs to sit in complete darkness for at least half an hour in order for residual light effects to dissipate. After that, it takes some considerable time to wait for the ultra-weak emissions to register. Here is an image of the head and torso of someone in total darkness, with spontaneously emitted biophotons as the only light source for the image:

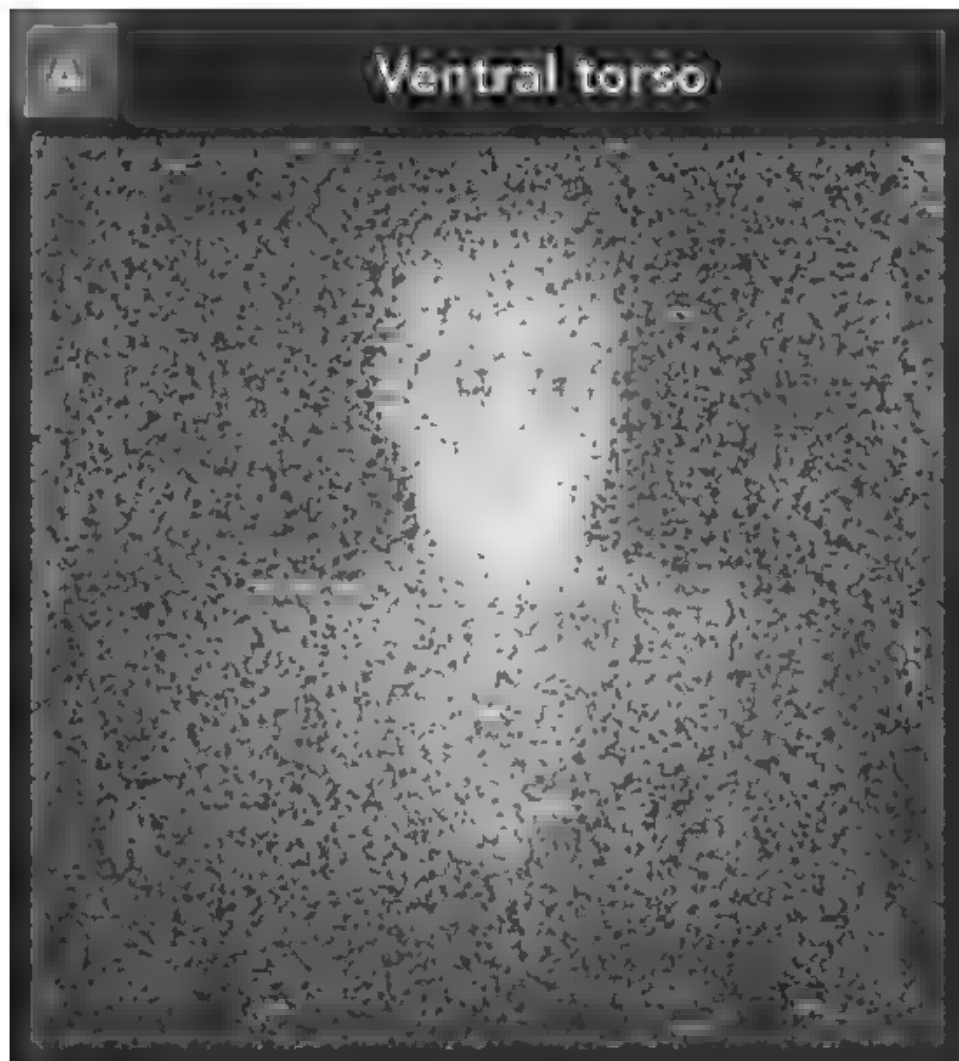


Figure 29 An image of the head and torso of a man sitting in total darkness, the only source of the light forming the image being the spontaneously emitted biophotons coming from his own body. For reasons that are not entirely understood, the eyeballs do not emit many photons, and so appear here as dark holes. Image courtesy of Professor Roeland van Wijk.

There is another way to detect biophotons by means of a portable detector with two long empty gloves hanging from the front. A person inserts his or her arms into the gloves, which reach to the elbow. The hands, being entirely in the dark inside the small machine, then have their spontaneously emitted biophotons counted by the machine's twin photomultiplier detectors. Just from counting the biophotons coming from the hands, it is possible to know whether a cancer condition is developing somewhere in the human body. A 'positive' finding then suggests that more tests should

be carried out to locate it. A 'negative' finding suggests that they are probably unnecessary and there is no cancer condition.

The main basis for this is that 'changes in ultra-weak photon emission occur in the transition from a healthy to a diseased state.'<sup>1</sup> And this is the earliest warning signal.

Biophoton research, despite all its promise, has been shrinking, not expanding. There is little or no funding for it. Public health officials are too dim to see its potential, and it is 'outside their comfort zone'. Big Pharma is never going to promote it, and most doctors don't know about it. The heyday of biophoton research was in the 1990s, when many publications on the subject appeared. But at that stage, the detectors mentioned above did not yet exist, so all that was written was based upon laboratory research, and the equipment was not yet in existence for public use.

The big-name researchers in the field at that time have mostly died or retired by now, and have not been replaced. One can go down the list of names prominent then, and one soon discovers that only a few are still alive, and several of those have become inactive because they could not find anyone to fund their work. The combined knowledge of several brilliant scientists from many countries is in danger of being lost to humanity through ignorance and prejudice. And the price of this ignorance and prejudice is that many, many people will die needlessly.<sup>2</sup>

The leading proponent and researcher of biophoton technology for human health today is probably the Dutch scientist, Professor Roeland van Wijk (known as Roel). Although he is now retired, his son Dr Eduard van Wijk leads a group at Leiden University in the Netherlands, to which his father is a leading scientific advisor. They are actively researching biophotons, and are apparently the only group in the whole of Europe doing so. Roel did important work earlier with another such group in Japan, headed by Masaki Kobayashi of Tohoku Technical University at Sendai.

In 2014, van Wijk published a mammoth book on biophotons in biology and medicine, which is extraordinarily clear and explanatory.<sup>3</sup> It can easily be read by any medical doctor or person with some basic education in biology. It is described as an interdisciplinary textbook, and the hope is that some academics somewhere will actually use it as such. In any case, the book exists, and van Wijk has done the public a great service. However, the

number of copies available is now very small, so that the book is not achieving the wide circulation it urgently needs

Biophotons were first discovered in plants by a brilliant Russian scientist, Professor Alexander Gurwitsch (1874–1954). (Gurvich is the correct Russian spelling, but he is more widely known as Gurwitsch, the spelling used for his German publications.) While studying the growth of onion roots in 1923, Gurwitsch was able to demonstrate the existence of biophotons, though he did not call them by that name

Gurwitsch's theory was that organisms grew in connection with fields of some kind, which he named 'morphogenetic fields' He was the first person in history to use the term 'field' in connection with biology, in a paper concerning the growth and development of embryos, which he commenced writing in 1911 and published in 1912. But at that stage of his work, he had no proof, only a theory. It was only in 1923 that he was able to demonstrate physical evidence for his theory. He had already concluded that cell division (known in biological terminology as 'mitosis') in embryos must require not one, but two, factors

The first was a 'possibility factor', meaning that the circumstances must become such that cell division was rendered possible The second was a 'realization factor', meaning that the cell division, having become possible, was then somehow triggered Without this trigger, it simply would not take place. He did not believe that this trigger was chemical. Instead, Gurwitsch decided that the way the organism as a whole triggered cell division for its embryonic cells to divide and grow must take the form of external non-chemical signals of some kind But what could they be, and how could the signals be detected by the cells?

He decided that each cell membrane must be 'an organ perceiving signals for cell divisions' Gurwitsch became the first person in the history of biology to use the term 'receptor'. He suspected that the cell membranes must contain 'receptors' of some kind to detect signals of some kind, to cause cell division, which he called 'mitotic signals'

Gurwitsch then carried out his now famous onion experiment, studying the growing tips of onion roots. (A drawing of the experimental setup is to be found on this book's website.) The roots had to be as even and smooth as possible, and were placed at right angles to each other so that the tip of one root was directed precisely at the zone of the other where cell division

would take place. He found that the tip of one onion root, which he called the 'inducer', when directed at the wall of the other onion root, which he called 'the detector', induced more cell divisions on the side of the detector root that faced the inducer root than it did on the shadow side

This led him to believe that some kind of signals (which he called 'external impulses') were being sent, affecting the near side much more than the opposite side. It was as if the near side was in the light and the far side was in the shade. Then he had the extraordinary idea of inserting first a glass plate and later a transparent quartz plate between the two roots. He discovered that the glass plate blocked the signals, so that no cell division ('mitogenetic activity') took place in the detector root. But the quartz plate did not block the signals. This unexpected and bizarre finding ruled out chemical or mechanical signals, since the signals were not blocked by quartz.

It quickly became apparent to Gurwitsch that the mystery could be solved only by postulating that the inducer roots were emitting photons in the ultra-violet range, and that those were the signals in play. As most people know, UV radiation from the Sun does not penetrate glass windows, which is why we do not get sunburn indoors even if we are sitting under a glass roof in the blazing sun. But ultra-violet radiation does penetrate quartz.

Gurwitsch called the ultra-violet signals 'mitogenetic rays', because they were rays causing cell division, i.e., mitosis. (As I mentioned earlier, the word 'photon' for light particles had only been coined in physics seven years earlier, in 1916, and it was not yet in common use, so the idea of calling his rays 'biophotons' did not occur to Gurwitsch. It was the German Professor Fritz-Albert Popp who introduced the term 'biophotons' in the 1970s to replace the terminology 'mitogenetic rays' )

A fascinating account of the history of Gurwitsch's work and discoveries was published in English in 2007 by his grandson, Professor Lev Belousov, jointly with his colleague Professor Vladimir Voeikov, entitled 'From Mitogenetic Rays to Biophotons'.<sup>4</sup> In this account, they explain that Gurwitsch looked for the evidence in order to support a theory he had formed, and how he found it. Lev and I were in touch and commenced a joint effort to preserve all of Gurwitsch's writings and place them on the internet. He was extremely enthusiastic about this. Suddenly he died of a

heart attack. But his efforts are being continued by his student and protégé Ilya Volodyaev, with whom I now cooperate in this. We are making good progress in preserving the material that is in Russia.

There was tremendous enthusiasm for Gurwitsch's discoveries, and Gurwitsch was nominated for the Nobel Prize in the 1920s and on numerous occasions over the years thereafter. Between 1923 and 1939, according to Belousov, more than seven hundred papers on the subject appeared, as well as books.<sup>5</sup>

Gurwitsch wrote in Russian and in German and very little of his work has ever been translated, but in the 1930s his work became accessible in Europe thanks to the appearance in German of one of his main books, written jointly with his wife and scientific collaborator Lydia Gurwitsch, *Die Mitogenetische Strahlung (The Mitogenetic Rays)*, published in Berlin in 1932. But by 1939, the Second World War brought about such chaos that communications and academic exchanges were interrupted, especially with Germany. Gurwitsch was awarded the Stalin Prize in 1941, but after the war his work was forgotten thanks partly to the Cold War between the Soviet Union and the West.

Furthermore, from 1942 Stalin's favourite and wholly dominant pseudo-scientist Trofim Lysenko began to persecute Gurwitsch, so that Gurwitsch was not allowed to work in any laboratory and became a political pariah. Gurwitsch's ideas thus dropped out of sight. My friend Joseph Needham, whose colleague I had the honour to be for some years from the mid-1980s, presciently supported Gurwitsch's ideas in 1950,<sup>6</sup> but this unfortunately had no significant effect on the widespread ignoring of the subject subsequent to 1939.

Gurwitsch also discovered that the emission of the ultra-violet photons must be coordinated by the whole organism, which he attributed to its morphogenetic field, in line with his pre-existing theories. He was extraordinarily prescient in this, because the work in physics had not yet been done to explain the mechanics of how such a field might work. It was only after his death that the concept of 'coherence' (in the specialist sense of waves having the same characteristics, such as phase and frequency, within a spatial area, as distinct from its better-known usage to describe

'superposition' in quantum mechanics) emerged in physics, as a result of a paper published by Robert Dicke in America in 1954.

This coherence only became a concept in biology many years later, which then made it possible to put some flesh on the bones of Gurwitsch's field theory. It is not granted to us all to live long enough to see our theories justified, and Gurwitsch did not have this good fortune. But in trying to figure out the mechanics of the process, Gurwitsch was ahead of his time, and became the first person to suggest the existence within organisms of what we now call 'collective states' and 'cooperative phenomena', but which he called 'states of mutual alignment and orientation of molecules'.

He suggested that this was associated with a redistribution of energy within the organism in an organized fashion at the macroscopic scale, and that chain reactions of signal propagations took place. It was the spatial organization of the whole organism that was important, and it superseded the importance of individual atoms and molecules, demonstrating to him the existence of biological fields.

All of these ideas now exist in far more sophisticated form, substantiated by a huge amount of experimental work. But 'mainstream biology' and 'mainstream medicine' show no knowledge or recognition at all of this progress. With one exception that I know of (a large grant by the Dutch Government), there are no grants or funding anywhere in the Western world for biophoton research. Scientists cannot yet live on air, and until they invent a way to do so, they must either starve or abandon their biophoton work. And biophoton work takes laboratory time, and needs assistants, and then the findings need journals willing to publish the results.

So difficult was it to find journals willing to publish biophoton findings even in the heyday of biophoton research that the small but international biophoton research community had to adopt a different strategy to achieve publication and get around the roadblocks of the unwilling journals. They held numerous international biophoton conferences, gathered up the papers of the speakers, and published them in volumes of conference Proceedings, and sometimes anthologies of papers were also published without an underlying conference as a source. The majority of the conferences were held in Germany and Russia, but the papers were published in English.

So underfunded were these endeavours that many of the papers translated into English by their non-English-speaking authors have poor grammar and

spelling, and strange phraseology and usages replicating those of the native languages of the authors, because there was no money to pay for most of the volumes to be copyedited or proofread. In quoting from some of these publications, I shall therefore correct their English, and thereby clarify their meaning. I shall do this in the rest of this book, simply for the sake of clarity.

This defect of language is particularly true of one of the most interesting biophoton books of all, *Current Development of Biophysics*, published in 1996 by Hangzhou University Press in China. The book is very rare, but it contains some of the most important insights relating to biophotons ever published.<sup>7</sup>

It had three editors, two of whom I know. The third editor was Professor Fritz-Albert Popp, whom I was never fortunate enough to meet because of his many years of debilitating illness before his death. The others were Marco Bischof and Zhang Changlin (I give his name in the Chinese form, with the surname first). Both of them are absolutely delightful men of warmth, humour, and brilliance of mind. Marco is a great scholar of the history of these subjects, who has been tireless in writing and publishing on the subject such fundamental, incisive, and broad surveys that they shall remain classic accounts for ages to come.

Leading international biophoton researchers who contributed to that volume were Popp (one of whose most important papers appears in it); Poland's leading researcher, Professor Barbara W. Chwirut; Gurwitsch's grandson Lev Belousov from Russia; Professor Roeland van Wijk; Professor Ke-Hsueh Li of the Chinese Academy of Sciences; and Professor Michael Lipkind of Israel, whose paper was entitled 'Application of the Theory of the Biological Field of A. Gurwitsch to the Problem of Consciousness'.

In the attached footnote, I give a list of important books on biophotons in English, many of which are extremely difficult to find, but all of which are of great importance. I have listed them chronologically by the dates of their publication.<sup>8</sup> A list of some important biophoton books in German that have never been translated into English is also included here.<sup>9</sup> (These bibliographies are to be found on this book's dedicated website.)



There are in addition numerous volumes not specifically devoted to biophotons, such as those concerning coherence in biological systems, which are nevertheless highly relevant and contain important material relating to biophotons. Some of these will be cited in the closing portion of this book, where physical ‘coherence’ is stressed in a wider context. And of course there is the book by van Wijk of 2014 already referred to, as well as a sequel volume by him, which appeared in 2017.<sup>10</sup>

It is important to tell people where to find information about this ‘suppressed subject’, as it took me a long time to discover and obtain all of these books, and it is not easy to do so. I therefore hope I have made it easier for others by listing them.

The biophotons themselves are only part of a much larger picture, which took shape largely as a result of studying the biophotons. It was the brilliant Russian scientist Viktor Mikhailovich Inyushin, who pushed the boundary much further in his writings about ‘bioplasma’. This term ‘bioplasma’ was coined in 1944 by the Russian scientist V.S. Grischenko (aka Grishenko). By 1967, Grischenko and Inyushin were working together on bioplasma, and they announced then that they envisaged a plasmatic state within living organisms which, in contrast to inorganic plasma, would be a cold plasma possessing a high degree of order.

This was an interesting idea, for the cold plasmas in space, such as the Kordylewski Clouds for instance, are more likely to be intensively ordered and to show ‘emergence’ and self-organization, and indeed inorganic life. One would not normally think that the human body could contain a cold plasma, which seems counterintuitive, considering how warm the body is.

But Grischenko and Inyushin worked out that this is possible. And what is more extraordinary, as we will see in a moment, they believed that this cold plasma would chiefly be found in the brain. So, to make it clear, bioplasma is the name they gave to that plasma which, they were convinced, joined with the physical body and helped it to operate, or even coordinated and guided its growth and development.

This idea was essentially the same as Aristotle’s pneuma ([here](#)). Just to remind the reader, Aristotle believed that aether existed beyond the Earth’s atmosphere and was a ‘fifth element’, and that pneuma was a somewhat inferior form of aether that actually was found inside physical bodies and

helped to animate them. Grischenko and Inyushin, doubtless without realizing it, have duplicated Aristotle's reasoning and consider plasma to exist in space, and bioplasma to exist inside our bodies (hence the 'bio-' prefix). And one of the manifestations of the bioplasma is the emission of the biophotons.

This was a concept where for every organism's plasma body, biophotons would just be one manifestation. Very few Western scientists were ever allowed to meet Inyushin, since he was considered by the former Soviet Union to be their most brilliant and important expert in the field of parapsychology, with its many military applications such as 'remote viewing'. His existence first became known to the outside world in the 1970s, and in 1977 a tantalizingly brief article by him of only five and a half pages appeared in English translation in the compendium *Future Science*, entitled 'Bioplasma: The Fifth State of Matter?'<sup>11</sup>

In this, he says:

A living organism can be described as a 'biological field' or 'biofield' — we have obtained evidence that a fifth state of matter, bioplasma, exists as a part of each organism's biofield. Bioplasma consists of ions, free electrons, and free protons. It is highly conductive and provides opportunities for the accumulation and transfer of energy within the organism as well as among different organisms. Bioplasma appears to be concentrated in the brain and the spinal cord. At times, it may extend considerable distances from the organism, raising the possibility of telepathic and psychokinetic phenomena.

It was the latter aspects that so interested the military and security services of the Soviet Union, in connection with what they called 'psychotronics', and they were careful to keep Inyushin under wraps, whereas other less important scientists in this field such as Viktor Adamenko were allowed to mix with Western investigators.

Inyushin had known the Kirlians, a husband and wife team who were the inventors of Kirlian photography, as they were his neighbours when he was young. As a boy, he had sometimes assisted them in their work. He thus built up a lifetime's background in investigating and experimenting with strange phenomena relating to living organisms of all kinds, including humans, especially psychic humans of the type of the American Ingo Swann, but only those who were within the Soviet Bloc, such as the famous Russian psychic Kulagina.

The Soviets had some truly spectacular people of this kind, who were the best recorded cases of psychokinesis, which means the ability to move physical objects around by the power of the mind alone, without touching them. It was Inyushin who provided the scientific theory to explain all of this. And that theory was a highly elaborate one that developed out of ideas of bioplasma.

Very little of Inyushin's work has ever been translated into English, except for secret translations that have never been released by the American security agencies. I have some privately translated writings of his, the earliest of which dates from 1969 and concerns acupuncture. These translations (in very poor English) were commissioned by my friend Marco Bischof, and he kindly let me have copies. Inyushin's work also related to biophotons, and as he wrote in his 1977 article: 'Our experiments with light indicate that bioplasma is especially conductive for photons in the ultraviolet range.' That is precisely what biophotons are, photons in the ultraviolet range. And he adds: 'Our group has hypothesized that an organism's bioplasma is an important factor in ... the emission of light from an organism from causes other than high temperatures.'

Inyushin's concept of a bioplasma body accompanying the physical body (which we might also call a 'dense matter body') will come back into the discussion in the next chapter. His bioplasma theory follows Gurwitsch's suggestion that biomolecules in the organism are predominantly present in the 'excited state'. I am again using the term 'excited state' in a quantum physics sense to mean that a system, or an electron, has absorbed energy and entered a state of having higher energy than normal. In Inyushin's account the energetics of living systems are based on excitation-deexcitation dynamics. Inyushin describes bioplasma as a 'cold' plasma of highly structured collective excitations produced by the polarization of biological semiconductors. In other words, the energies in bioplasma bodies are dynamic grids of excitations which interact with fields outside the body.

In 1967, at the same time that Grischenko and Inyushin were announcing their bioplasma hypothesis, the Polish biologist Włodzimierz Sedlak (1911-1993) independently came up with his own bioplasma hypothesis as well. He and Inyushin later got together and worked on the idea jointly. This was facilitated because at that time Poland was part of the Soviet Bloc so that

their mutual cooperation was considered acceptable by the authorities. Inyushin himself lived in Alma Ata in Soviet Kazakhstan. Inyushin also researched biophotons.

According to the bioplasma studies of Inyushin and Sedlak, the plasma particles constituting the bioplasma in the body set up highly structured waves of excitation, that, as we have just seen, serve as an energy network. The energies stored in the network form an internal 'biological field'. Remarkable as it may seem, this 'biological field' has a complex broadband wave structure of great stability that stores holograms.

In exploring the complexities of plasma in the body and its connections with consciousness and images in the brain Inyushin and Sedlak are here leaning on the work of Professor Karl H. Pribram (1919–2015) who originated the 'holonomic brain theory' to explain consciousness, using the idea of holographic memory.<sup>12</sup>

Most people today are familiar with holograms, and are aware that the making of holograms (holography) has something to do with light rays, though they may be vague about how it all works. A hologram made by this method is a 'picture' not of an actual image, but instead of a light-wave interference pattern. When the pattern is activated then the image appears in a three-dimensional mode. The internet is full of explanations of how this is done. However, what few people realize is that holograms can be made without the use of light rays.

Karl Pribram explained this at length as long ago as 1971 in his technical book *Languages of the Brain*.<sup>13</sup> He believed that holographic processes operated within the human brain, and were used in the storing and activation of memories in particular. Pribram said:

Optical systems are not the only ones that can be subjected to the holographic process. Holograms are thus not dependent on the physical presence of 'waves'. This independence of holography from physical wave production is an important consideration in approaching the problem of a neural holographic process.

Clearly, it would take too long to summarize here Pribram's theory of the brain-as-a-hologram, about which many books have been written, not least by Pribram himself. But it is important to realize that enormous intelligences in the Kordylewski Clouds would probably have fantastically advanced holographic capabilities, which would be used not only to store

their massive amounts of information, but also to generate images in any form, whether as wave-forms, pure data, or optical images that could be seen by the eye (if there are any eyes in the clouds). Technically, none of this poses any problem. The clouds would readily be able to extract 3-D images of the kind familiar to us and transmit them to our brains if they wished to do so. We could even make a pun and call this ‘Cloud holography’, and the cloud in this case, of course, is not owned by Apple.

Another Polish researcher, Adam Grzegorz Adamski, says that a lot of bioplasma is stored in melanin, which as most people know exists in the skin and protects us from ultra-violet radiation by causing us to get tan or brown. He says:

Melanin is not only a semiconductor, but also a room temperature superconductor. Melanin accumulates in the cells of the nucleus, where the genetic material (DNA) is, in order to protect the genetic code from the damage from UV-rays. These properties of melanin reveal that it has large resources of bioplasma. With the semiconductor properties of proteins and melanin electrons can travel over long distances without losing energy. Bioplasma is understood as a dynamic system in an organic semiconductor. The total energy of the bioplasma consists of thermal motion, kinetic energy of particles, floating particles, the electric field, the magnetic field, and solitons.<sup>14</sup>

We can see how like so much else these studies draw heavily upon the early pioneering work by Albert Szent-Györgyi, who was the first person to insist that the body contained organic semiconductors, as I have already described. Just as the work of Alfvén and his followers has revealed the complex, living reality of outer space, and the interactions there of plasma and electromagnetism, so his fellow Nobel laureate Szent-Györgyi and his followers have revealed the immensely and astonishingly complex operations of electromagnetism and plasma within the human body, and outside it too.

Returning briefly to the subject of biophotons, when they are seen being emitted from acupuncture points and meridian lines, they are not a sign of cancer at all, but rather an indication of the normal heightened activity in those key regions of the body. Biophoton scans actually give clear visual images of the mysterious flowing body energy (doubtless a flowing plasma) known as qi (pronounced ‘chee’) in Chinese acupuncture. These streams inside the body, which have been detected frequently, are known as ‘light-piping’, more technically described as ‘channels of light emission’. Such

channels form a meridian network. This is one of the most important areas for research, since its findings clearly validate the Chinese system of acupuncture points and meridians in the body. The light pipes and the traditional acupuncture meridians are the same.

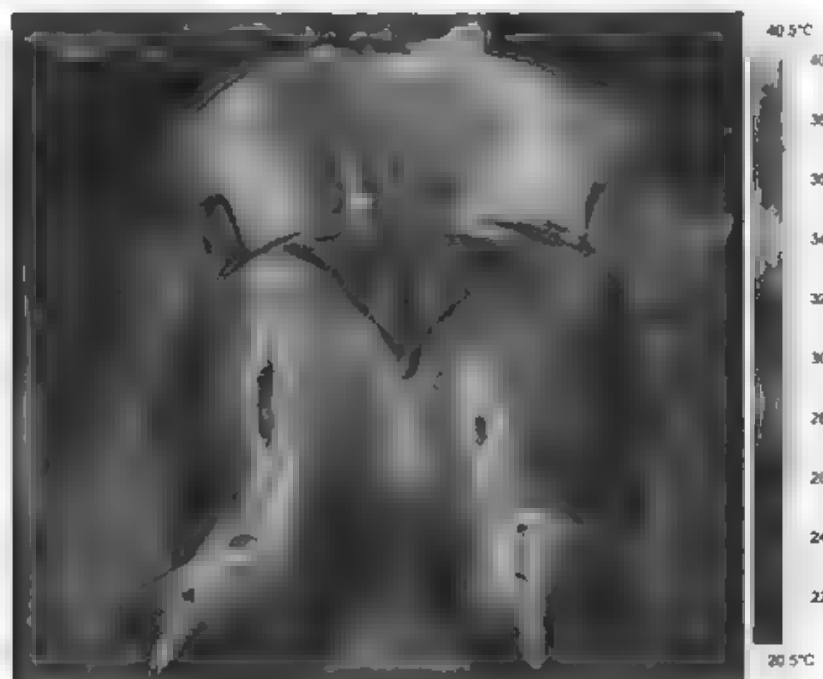


Figure 30 Biophotons being emitted along the meridians of the backs of the legs. Image courtesy of Professor Roeland van Wijk.

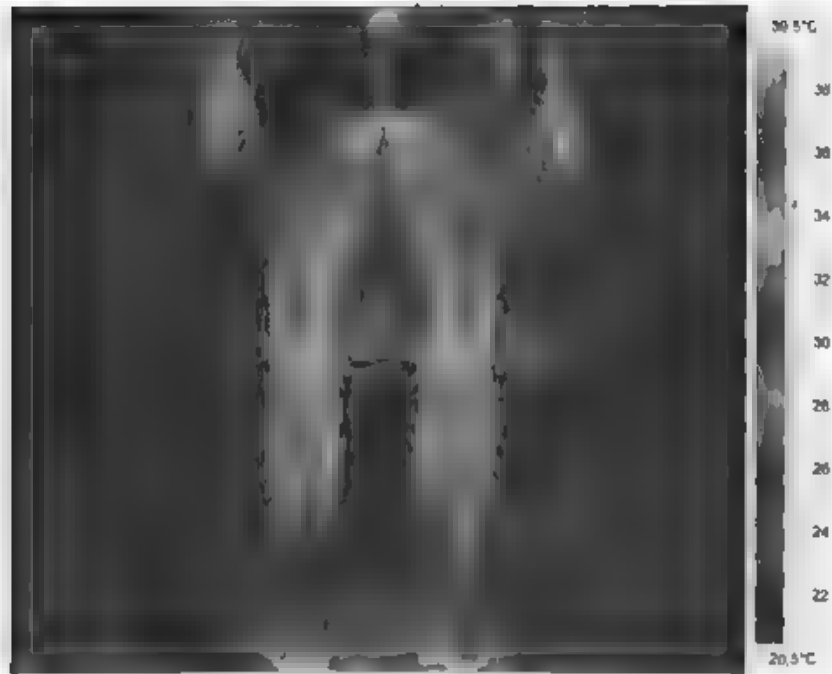


Figure 31 Biophotons along meridians of the legs seen in the standing position. Image courtesy of Professor Roeland van Wijk.

As we build up a picture of the role of plasma within human bodies and consider the idea that plasma may provide a medium for interaction with universal fields, we see again that ancient wisdom anticipated cutting edge discoveries in modern science.

## *The ‘Death Flash’ and the ‘Life Flash’*

In the previous chapter we looked at the role that plasma has inside the body – forming and regulating it and maintaining health. In this chapter, we will look at it in relation to death.

It has been said that at the moment of death, a flash of light is emitted by the body. There are many reports of this. It applies to all living organisms, not only to people. The evidence concerning this flash of light is extensive, and the speculations concerning it have entered into works of fiction and film.

This is one of the most important details about the relationship between the physical body and any animating plasma body that may co-exist with it. It is what has come to be known as the death flash.

In case there are misunderstandings, I should point out that, apart from the exceptions described below, the only spontaneously emitted light from our bodies consists of biophotons, as was discussed in Chapter 15. They cannot be seen by the eye because they are what is called ultra-weak and low intensity. It only became possible to detect them at all after the laboratory devices known as photo-multipliers were invented in the 1950s.

Let us find out more about the ‘death flash’, however, because although it cannot be seen by the unaided eye either, apparently it is followed by a faint mist that is visible to the naked eye, but only for an instant, and you have to be looking intently at where it is about to happen just when it does.

The Polish biophoton researcher, the late Professor Janusz Ślawinski (1936–2016), published a summary of many of the occurrences of the ‘death flash’, technically known as ‘necrotic [from *nekros*, the ancient Greek word for a dying person or human corpse] photon emission’, with his extensive comments, in 1987.<sup>1</sup> In it, he says:



All living organisms emit low-intensity light, at the time of death, that radiation is ten to 10,000 times stronger than that emitted under normal conditions. This 'death flash' is independent of the cause of death, and reflects in intensity and duration the rate of dying. The vision of intense light reported in near-death experiences may be related to this death flash, which may hold an immense amount of information. The electromagnetic field produced by necrotic radiation, containing energy, internal structure, and information, may permit the continuation of consciousness beyond the death of the body.

This is clearly very important information. Considering how terrified most people are of dying, you would think that this information would be more widely circulated, if only to assuage people's anxieties. But strangely, few people have heard about it. This is puzzling to me. I think it must be because we live in a world today where intellectuals, mainstream social opinion-formers and mass media all subscribe to a rigidly materialistic view of life, and are intolerant of anyone who challenges this arid position in even the slightest way.

The first time I came across the idea of a 'death flash' was in a work of fiction. In his 1931 novella *The Weigher of Souls*, André Maurois adopts his own persona as the first-person narrator.<sup>2</sup> He says he has been a French liaison officer with the British and that the British officer with whom he shared a tent was a medic named Dr H B James. That is how the strange adventure begins, for the narrator comes to London after seven years of not having seen Dr James and decides to look him up.

The action is thus set in London in 1925, and the novella is consciously written in the style of an Edwardian mystery or science fiction story, heavily influenced by Conan Doyle and H.G. Wells – the reader half expects Sherlock Holmes to appear, or a time machine to be mentioned. But Maurois has a much more subtle tale to tell than at first appears. Dr James is working at 'Saint Barnaby's Hospital', a very Victorian establishment on the South Bank of the Thames. London is described in the best Conan Doyle tradition as covered with fog:

Whilst we had been dining, a thick fog had come down over the streets. The gleaming headlights of invisible cars planted it with rings of red and white light. Ludgate Circus was a landscape of nightmare. James bade me take his arm and guided me towards a bus. The bus crossed the river in the midst of a veritable bank of yellow cotton wool. Factory fires on that baleful shore gleamed vast and pale through the flocculent gloom. The lights of the hospital shone feebly in the enveloping cloud. My companion's nervous state seemed to be one of violent overexcitement.

James has become such a haunted and distracted person, so different from the narrator's jolly wartime friend, because he is engaged in forbidden experiments, which he carries out in the morgue of the hospital at great risk of being discovered. He has discovered that something strange happens at death and he wants to investigate it. He says he got the idea from experiments carried out by Sir William Crookes, one of Victorian Britain's most distinguished scientists, who later in life developed an interest in spiritualism (discussed earlier in Chapter 3). James explains:

'I once read an account, in a medical paper during the War, of an experiment made by a certain Dr Crooks [*sic* it should be Crookes, and I see that the misspelling occurs also in the original French edition] He described how he had weighed the corpses of animals, and had observed that, after a period approximately regular in a given species, there was an abrupt drop in weight

In a man he reckoned this fall as averaging seventeen-hundredths of a milligram. From which he concluded that the soul does exist, and that it weighs seventeen-hundredths of a milligram

'Last year, as circumstances and hospital routine placed corpses at my disposal, it occurred to me to verify the facts registered by Crooks, and with some surprise I discovered that he had told the truth. Only, he had stopped the experiment too soon. In man the normal curve of evaporation is almost always interrupted, not once, but three times by sudden falls. The first, which you have observed to-night, takes place about one hour and thirty-five minutes after death, and is between fifteen- and nineteen-twentieths of a milligram, the second and third follow the first at intervals of twenty minutes and one hour respectively. Regarding the results of the experiment, no doubt is possible

'Let me add that I have repeated them with animals. Whence the rats which intrigued you. And there, too, Crooks's results are correct. There is always a sharp drop, but its extent is very much less than in man. Such are the facts, the interpretation, of course, admits of argument

His pipe had gone out. He relit it and looked at me. I was careful to say nothing. He continued

'At this stage, this is what I put forward. It seems to me possible to suggest, not that the soul weighs seventeen-hundredths of a milligram, but that every living creature is animated (in your language you could almost say *âme*) by a certain form of energy, still unknown, which leaves the body after death. That all energy possesses mass is something admitted by the post-Einstein physicists. You know that light can be weighed, and that theoretically light could be compressed in a receptacle ... Well, why not vital energy likewise?'

James decides that he wants to catch the mist that rises from a person who has just died in a glass receptacle. This is what he believes has the slight weight. And as a scientist friend of the narrator says: 'Why shouldn't there be "psychons" as there are electrons?'" James wants to capture the evanescent psychic substance of a dying person, and keep it captive to study it. He makes it visible by ultra-violet light in an otherwise dark room. He succeeds in capturing the spirit of a dead rat in a glass bell jar.

The narrator sees it in the dark as a faint glow, about the size of a nut, but more elongated: 'Going closer, I saw that the interior of this luminous kernel contained darker currents revolving extremely slowly. The whole thing reminded one of the appearance of certain photographs of celestial nebulae.' Remember the whirling plasmoids of Bostick that we encountered earlier, which he compared to galaxies?

The story gets weirder and weirder. At last, the narrator is present at the death of a human being, and James has his glass bell jar ready. Maurois says:

I saw a faint blue mist appearing. At first it seemed shapeless and as if diffused (then) the vapour became condensed in a milky mass, about four inches long, the base of which was horizontal, with its rounded top following the curve of the globe. Currents of lighter and darker colour were visible in it until they formed an object of well-defined outline (a) ball of light

I do not wish to spoil the enjoyment of anyone reading the novella by saying what happens as the story progresses. But it does become increasingly bizarre.

Subsequent to the appearance of this novella, and perhaps partially because of it, a legend was born that each of us has a soul that weighs 21 grams. Although largely unknown in the English-speaking world, there were some French intellectuals who became interested in 'the weight of the human soul'. One of these was Wilfried-René Chettéoui, who had been influenced in his thinking about the soul by studying the Siberian Shamans (about whom he published a book in 1947) and who wrote in a paper published in 1986:

Various investigations established the weight escaping at the moment of passing to be between 60 and 70 grams. The quantity of spirit is without mass, and consequently the weight of a spiritual being is almost negligible.<sup>3</sup>

Much better known than any experiments by Sir William Crookes were those carried out in America by Duncan MacDougall (1866–1920) in 1901. He weighed six dying human patients, five male and one female. He calculated the weight of the human soul at between six and eight ounces. He also tried to photograph the escaping human soul from dying persons. But as we now know, if one is looking for a light flash (a biophoton flash), it is too faint for the human eye or any normal camera to detect, even

though it may be, as Slawinski discovered, as much as 10,000 times stronger than a biophoton is normally. But even that remains ‘ultra-weak’, as all biophoton emissions are.

One presumes that the faintly visible mist follows the ultra-weak ‘death flash’, and escapes the body by floating upwards. The ‘death flash’ presumably heralds the commencement of the process of death, and the ‘mist’ completes it. By 1907, MacDougall had refined his estimate of the weight of the soul to 21 grams (about  $\frac{3}{4}$  of an ounce),<sup>4</sup> which is where that value originated. This was the source of the title of a 2003 film starring Sean Penn, *21 Grams*, which popularized the notion that the human soul has a tiny mass.

I might mention in passing also that the ancient Egyptians depicted the weighing of the human soul in a balance against a feather (representing Truth), and they maintained that if the soul were heavier than that feather it would be annihilated. Presumably at 21 grams it would just squeak through.

Inevitably most descriptions of a faint mist leaving the body of a dying person come from relatives or friends who have been sitting near a dying person, often in hospital. Here is a typical example of such a story, recounted by a woman who lay in one bed of a double bed room in a hospital, of what she saw happen to the older woman in the other bed about midnight; she related this to her daughter the next day, who wrote it down:

Late one night shortly after twelve o’clock, my mother lay awake. Suddenly, she told me, she felt her attention drawn to Mrs Melberger’s bed. As she watched, she saw a white mist arise from her head. It hovered for a few seconds, then slowly began spiralling and floated away from the woman and out through the closed door of the room.

The woman then fell asleep and when she woke up in the morning the bed opposite her was empty, and the nurse told her that Mrs Melberger had died a little after midnight.<sup>5</sup>

Obviously it is impossible to carry out laboratory experiments on dying people in order to look for mists, so it is difficult to imagine how this phenomenon can ever be ‘scientifically proved’, no matter how many accounts exist. It is easy to debunk such accounts if one has fixed ideas that no such thing can happen. It is equally easy to believe everything if one has fixed ideas that anything of that kind is possible.

I have no personal experience of this. I only sat beside a dying person once, the author Rosamond Lehmann, but I summoned a doctor and left before she actually departed a short while later. (Ironically, she had a passionate belief in the survival of death and was a member of the Society for Psychical Research.) It is because people essentially believe what they like when evidence is subjective that I have excluded my own subjective information from this book.

In addition to the visual observations of a faint mist leaving the body at death, there have been other strange observations under more controlled conditions. In 1970, Ostrander and Schroeder, who interviewed many Soviet scientists, stated that some of the scientists had taken many photos of dying animals and plants using Kirlian photography and other techniques. One of the scientists involved in these studies was Professor Viktor Mikhailovich Inyushin, who as we have seen, knew the Kirlians when he was a child, and who originated the concept of *bioplasma*.

Here is what Ostrander and Schroeder said:

[I]n the course of their extensive research with the Kirlian process, the Soviets have many times photographed the moment of death. Little by little as a plant's or animal's physical body dies, Russians saw sparks and flares of the bioplasmic body shooting out into space, swimming away and disappearing from sight. Gradually there was no luminescence at all coming from the dead plant or animal. Meanwhile, biological field detectors at a distance continued to detect pulsating force fields from the now dead body. Is this energy coming from the dispersing bioplasmic body?<sup>6</sup>

Although this account refers only to studies of the deaths of animals and plants, I have found an account of studies of humans in a rare book published in English in Russia shortly after the fall of the Soviet Union by Dr Konstantin G. Korotkov, then a young scientist who had only recently completed his PhD.<sup>7</sup> He describes his studies with colleagues using something called the 'gas discharge visualisation (GDV) technique' to study energies in living beings. The technique involves placing fingers on glass electrodes that are then supplied with a high voltage and high frequency pulse. The electric discharge around the finger produces light that is digitally photographed and sent to a computer, where special software does quantitative analysis of the numerous parameters.

Korotkov tells us in his book (I have had to make a few grammatical improvements because the English was flawed):

Does the life of the soul end with death? What should we expect beyond the threshold of this world? These problems, which have always beset mankind, are again making their appearance on the European intellectual horizon. Religions and esoteric knowledge have always taught that death is much more than merely a transformation of living material into dead material. Now that recollections of people who have experienced clinical death [NDEs, or near-death experiences are here referred to] are becoming accepted as real, the question of survival of some vital elements is entering the realms of science.

Many of the physicochemical processes occurring at the time of death are known. These changes proceed in linear fashion with the gradual process of destruction and decomposition. The Gas Discharge Visualisation technique, however, goes beyond the classical biochemical approach, to reveal some aspects of energy and information in the living body. This being so, it became of great interest to find out how this changes after death. In this way we might gain information of how the transition from the dying state to death takes place. The experiment was organized as follows:

A special group of doctors and assistants took part in every experiment. The selected [human] body was transported to the experimental room and was placed in a definite position. The left hand was installed in a definite position on an electrode and was fixed by a special device that ensured a stationary position of the hand and the fingers during the experimental session. The discharge Kirlian photos of four fingers (excluding the thumb) of the left hand were taken every hour during the day and during the night.

Then the photos were processed in controlled conditions, scanned to the computer and from each image a set of parameters (area, average intensity, fractality, etc.) was calculated. Then graphs of these parameters plotted against time were created. As a result of this process we got for every experiment the [graph] curves of glow intensity changes in time during 3 to 6 days and were able to compare these curves.

The results were numerous, and are presented in the book in technical form with graphs. More than sixty scientific papers were also published in Russian over many years reporting these results. Here are the conclusions as briefly expressed in the book:

On the basis of these results we conclude that the energy-information activity of a person does not go to zero at clinical death. In some cases it continues to be present even as much as four days after death – a time when all biochemical processes characteristic of life will have ceased and been replaced with autolytic and putrefactive processes. It was particularly significant that the course of decline depended on the cause and nature of death. In some years these experiments had been reproduced both in our laboratory [at the Federal Technical University of St Petersburg], and in some others. The results were in principle the same.

It seems, then, that traditional spiritual teachings are right in their insistence that something of a person survives after death. These results raise not only biological and practical questions, but also philosophical ones. Our common-sense materialistic view of life and death need some correction.

Since so many people who have had near-death experiences report that they ‘floated upwards to the ceiling’ as soon as they left their physical bodies, and looked down upon them from above, that would seem to tally with the rising mist escaping from the body. On the other hand, I have friends who

came back to life after floating up to the ceiling, so does the mist get sucked back downwards again? Clearly, we are in speculative territory here.

Slawinski published a very technical article about the death flash, complete with twenty-eight equations and nine diagrams, in 2003 in the large volume of papers entitled *Integrative Biophysics· Biophotonics*.<sup>8</sup> In this important paper, he puts forward in great detail a model that:

accounts at least partially for the experimentally determined properties of a stationary and necrotic [death] photon emission from an intact and irreversibly perturbed (dying) organism, respectively (but) where do biophotons come from and where do photons of the necrotic radiation go to? Is there any Kingdom of Light, beyond the stars, planets, plants and animals?

These questions challenge us to enrich our understanding of biophotons and the mystery of life and death

Light has been always intrinsically related to the creative power that gives birth to life. Indeed, the cell division, fertilization of an egg and the death of the cell are accompanied by PF [photon emission]. Light is considered as the unitary purposive principle which engenders the Universe [he does not say by whom, but he is presumably referring to some religious traditions and possibly the views of some scientists, especially in light of what he says next about photosynthesis] and that has the nature of first cause. It is an ultimate source of energy on Earth and a driving force of photosynthesis and other photobiological processes.

Recent findings suggest that biophotons convey hidden information coded in the spatiotemporal parameters of the electromagnetic field, such as a degree of coherence. Therefore biophoton emission might deliver important information about the onset and the end of life processes. If necrotic PE [photon emission] appears to be a universal phenomenon announcing the end of biological life, then its measurements could be a new criterion of biological death.

This is an interesting suggestion, that clinical death could be measured by this new means. It might avoid mistakes such as people being declared dead on the basis of their breathing having stopped, or their hearts having stopped beating, and then nevertheless they suddenly return to life, occasionally after having been taken to the morgue as a corpse. Sometimes people can 'come back to life' after an astonishing length of time. The novelist Franz Werfel was declared clinically dead in 1943, but then came back to life forty-five minutes later, and recounted an amazingly detailed near-death experience that occurred to him during that time.<sup>9</sup> (He died a second time, staying dead, in 1945.) Perhaps biophoton measurements would provide a new and foolproof method of determining genuine death.

Many people reading about this will be unaware of the astonishing progress made in recent years in understanding aspects of light never previously suspected. Much of this research has been funded by

governments and corporations rushing to perfect quantum computing, and some of it can help us understand how the processes involved in the death flash might work.

To take one example, a team of scientists at Stanford University in California as long ago as 2005 (which in this field seems like the age of the dinosaurs) published a paper entitled ‘Generation and Manipulation of Nonclassical Light Using Photonic Crystals’<sup>10</sup> They are talking about cavities inside minute crystals capable of storing photons. At the head of this paper they inform us: ‘Photonic crystal cavities can localize light into nanoscale volumes (somewhere between a molecule and a virus) with high quality factors. This permits a strong interaction between light and matter . . .’ This field is now referred to as nano-photonics because, obviously, it takes place at the nano scale and is hence a branch of nano-technology. These areas of science are certainly underreported.

When considering a burst of light as weak as that of the ‘death flash’, we need to keep in mind that light can be stored, inside one of these photonic crystals, also called a ‘light crystal’. These crystals exist at the upper end of the nano-scale, meaning they are about the size of viruses. In laboratories, light crystals have been fabricated in one, two, and three dimensions. One of the reasons why so much work has been done on this is because people wish to use them to construct ‘optical computers’, by which is meant computers that employ photons for the purposes of computation.

Turning back to our main concerns, at the nano scale all organisms apparently contain countless ‘light cavities’, or nano-voids. If we have earlier been puzzling therefore about where the light would have come from that is released in the ‘death flash’, we have plenty of potential ‘light cavities’ throughout the body to choose from. Maybe the pineal gland contains one or more, for instance, as it is known to have some unexplained light-sensitivity aspects. The main point is that light storage happens all the time, so the release of a burst of light poses no real logistical difficulty. In other words, the storage of such a body of light would be entirely normal when the organism was alive, and its release at death could be automatic. I am speaking only in general terms, as not enough is known yet to be more specific.



We don't necessarily need to know where a death flash comes from. The Polish scientist Barbara Chwirut published a paper in 1998 with the pertinent title 'Do We Always Need to Know Molecular Origin of Light Emitted by Living Systems?'<sup>11</sup> In this paper she says:

it is now commonly accepted that both the intensity and the spectrum of the ultraweak luminescence depend strongly on the physiological state of the living systems, on their state of development and on the actions of the external factors, especially those that can be considered the stress factors

And of course, the ultimate stress factor is death.

Reports of mist arising from a dying person have been reported frequently over the years, and the subject has been mentioned in various scattered publications. But a good place to turn to for some collected evidence is the book *Glimpses of Eternity* by Raymond Moody<sup>12</sup> In describing the strange mist that appears over the deathbed, Moody says:

They describe it in various ways. Some say that it looks like smoke, while others say it is as subtle as steam. Sometimes it seems to have a human shape. Whatever the case, it usually drifts upward and always disappears fairly quickly.

Moody's book is full of accounts of deathbed experiences and things that people have seen when their loved ones were dying. One man named Tom described watching the death of his mother: 'I saw this film or transparent envelope of light close up and lift off her body going upwards and out of sight.'<sup>13</sup> Moody quotes a medical doctor who told him:

I have seen mist coming up from deceased patients twice in a six-month period. The mist had depth and complex structure. It seemed to have layers with energetic motion in it, which is a poor description, I know, but just think of something as subtle as water moving within water.<sup>14</sup>

A hospice psychologist told him:

I saw patients leave their bodies in a cloud form. I saw them rise out of their bodies and head toward these structures. I would describe these clouds as a sort of mist that forms around the head or chest. There seems to be some kind of electricity in it, like an electrical disturbance.<sup>15</sup>

In a 1975 book entitled *Beyond Life's Curtain*, Dr Bernard Laubscher repeats descriptions given by carers sitting beside dying persons in care homes:

While watching at the bedside of the dying one with one or two candles burning, they had seen the formation of a faint vaporous body, an elongated whitish purplish-like cloud, parallel with the dying person and about two feet above the body. Gradually, this cloudlike appearance became denser and took on the form, first vaguely and then more definitely, of the person in the bed. This process continued until the phantom suspended above the body was an absolute replica of the person, especially the face. They noticed that there was a light all around the outline, which I could only compare to a neon tube.<sup>16</sup>

The neuropsychiatrist Dr Peter Fenwick and his wife Elizabeth Fenwick in their 2008 book *The Art of Dying* speak of the 'smoke', 'grey mist', or 'white mist' that leaves the body at death. An informant named Penny Bicliffe told them about what she witnessed when her sister died:

I saw a fast-moving 'Will o' the Wisp' appear to leave her body by the side of her mouth on the right. The shock and beauty of it made me gasp. It appeared like a fluid or a gaseous diamond, pristine, sparkly, and pure, akin to the view from above of an eddy in the clearest pool you can imagine . . . It moved rapidly upwards and was gone.<sup>17</sup>

Another woman described the death of her husband:

I turned my head to see if Keith was awake, and as I looked I saw a shimmering haze (similar to what you might see above a road on a hot summer day) hover above Keith's sleeping head, and then it gradually rose up to the ceiling and vanished.<sup>18</sup>

A physician named Dr R B Hout was present at the death of his aunt and witnessed the following:

My attention was called to something immediately above the physical body, suspended in the atmosphere about two feet above the bed. At first I could distinguish nothing more than a vague outline of a hazy, fog-like substance. There seemed to be only a mist suspended, motionless. But, as I looked, very gradually there grew into my sight a denser, more solid, condensation of this inexplicable vapour. Then I was astonished to see definite outlines presenting themselves, and soon I saw this fog-like substance was assuming a human form. The features of the face were very similar to the physical face, except that a glow of peace and vigor was expressed instead of age and pain.

The eyes were closed as though in tranquil sleep, and a luminosity appeared to radiate from the spirit body. There was a silver-like substance streaming from the head of the physical body to the head of the spirit body. The colour was a translucent luminous silver radiance. The cord seemed alive with vibrant energy. I could see the pulsations of light stream along the course of it, from the direction of the physical body to the spirit 'double'. With each pulsation the spirit body became more alive and denser, whereas the physical body became quieter and more nearly lifeless.

Hout said that when the pulsations stopped, various strands of the cord snapped. When the last connecting strand snapped, 'the body rose to a

vertical position, the eyes opened, and a smile broke from the face before it vanished from my sight.’<sup>19</sup>

A report published on the day of my birth, 25 January 1945, quoted an American soldier back from the Second World War as saying:

‘I have seen ectoplasm on the battlefield. I have watched it emanate from a badly wounded soldier and then disappear as that soldier breathed his last.’ One hillbilly comrade from Kentucky called it ‘soul mist’, revealing that many natives in his part of the country considered it quite a normal thing, although they seldom talked about it. He went on to tell how, after being wounded by shrapnel, another soldier lay badly wounded about ten feet from him.

‘I looked at him with pity, forgetting my own pain. Then in the deepening twilight I saw a strange smoke begin to curl above him as though coming from his stomach as he lay on his back moaning. Then I remembered what my friend had said about soul mist, and I watched fascinated as the ectoplasm became denser and began to flow towards me. For a moment I thought I saw in it the face of a kindly old lady. Presently it reached me and for a second I was bewildered by a strange sensation that came over me. I felt stronger. With my left arm I raised myself and began to crawl to the dying soldier. I reached for my canteen of water. The mist was still around me, and with a sudden effort I was on my feet, and beside the soldier.

‘To my dying day, I shall believe the ectoplasm from the body of that dying soldier had helped me in a mysterious way. It had given me sufficient strength to save my life.’<sup>20</sup>

And there is not only a ‘death flash’, there is also a ‘death signal’ before that. This bizarre finding has so far only been verified at a very small scale, but it is believed to occur in the body as a whole. One of the earlier articles reporting this phenomenon known as ‘programmed cell death’ (PCD) was written by Michael Otmär Hengartner when he was working at Cold Spring Harbour Laboratory in New York.<sup>21</sup> He is now President of the University of Zurich. He reported that the deaths of cells (‘cell deaths’) seem to occur as a result of what he called a ‘suicide program’. Further study of this strange phenomenon has been primarily done at Stanford University by Professor James E. Ferrell, Junior, and Xianrui Cheng, who is a post-doc colleague of the older Ferrell, who works at the Stanford Cancer Research Laboratory in the School of Medicine.

Ferrell and Cheng’s discoveries were first announced in a press release by Hanae Armitage of Stanford, on 9 August 2018, followed the next day by the publication of a key paper by Ferrell and Cheng in *Science* magazine.<sup>22</sup> The press release commences by describing their discoveries like this:

In a cell, death is akin to falling dominoes. One death-inducing molecule activates another, and so on, until the entire cell is shut down, a new Stanford study finds. Inside a cell, death often

occurs like the wave at a baseball game. What starts with two hands flung skyward prompts another, and another, until the wave has rippled far and wide across the whole stadium. This kind of a rolling surge, spurred by the activity of one or a few things, is known as a trigger wave.

A new study out of the Stanford University School of Medicine has found that this phenomenon guides one of the most well-known and widespread forms of cell death: apoptosis. It's not the first time trigger waves have been identified in the microcosms of life. The cell cycle, a cornerstone of cell biology in which cells divide to make new cells, regulates production via trigger waves, too. So do neuronal action potentials, which allow neurons to pass signals via electrical impulse. And it likely doesn't end there.

One really has to congratulate Hanae Armitage, who can write a press release worthy of a science journal in its own right.

The technical word for cell death, as we have just seen, is apoptosis. Cheng and Ferrell put a lot of effort into researching whether 'the propagation of apoptotic signals' (signals that say 'Die! Die! Die!' to cells) could possibly be chemical diffusion. But they were able to demonstrate that this was all happening by trigger waves, which act in a very peculiar way indeed. If the signals had been by chemical diffusion, they would have slowed down with increasing distance. But the trigger waves did not slow down no matter how far they travelled. In fact, they progressed relentlessly at a constant speed.

They do this by 'positive feedback' in the signal transduction (transmission of signals to cells), which allows 'signals to propagate quickly over large distances without diminishing in strength or speed. We suspect there may be other examples of trigger waves in intra- and intercellular communication.' The steady speeds of the death waves studied by Cheng and Ferrell were 30 micrometres per minute. Because the waves resemble the flows of calcium ions (which had been studied to such an extent by Peter Mitchell, who was mentioned earlier), which are ionic charged currents, we can regard them as genuine plasma flows.

In other words, death appears to take place by plasma signals, which are able to traverse cells without losing any strength or slowing down.

The body is riddled with bio-currents such as 'proton pathways', 'electron pathways', and 'ion pathways' sending signals every which way. I had intended to write a chapter about this, with emphasis on the work of Peter Mitchell, but decided it was not necessary for this book, which contains enough information as it is. One amusing little tidbit that I cannot resist mentioning, however, is what R.J.P. Williams said in *Nature* in 1995

about protons moving along proton pathways inside the body: 'Protons move in very short hops (smaller than one angstrom unit) [one tenth of a nanometre] and require rotational movements of many donor and acceptor groups to make the process continuous.'<sup>23</sup>

I thought the idea of hopping protons was so funny, readers might like to have a good laugh at the thought. However, the death signals travelling at constant speed are evidently not transmitted by hopping protons, but by speedier and more reliable means.

Death signals by photons had previously been detected by the Russian scientist Vlaiil Petrovich Kaznacheev (aka Kaznacheyev) in a series of more than five thousand experiments carried out at his Institute of Clinical and Experimental Medicine in Novosibirsk in Siberia. In 1976, an English translation of one of his papers appeared discussing the apparent 'paranormal transmission of death' between cells.<sup>24</sup> It included this diagram of the process:

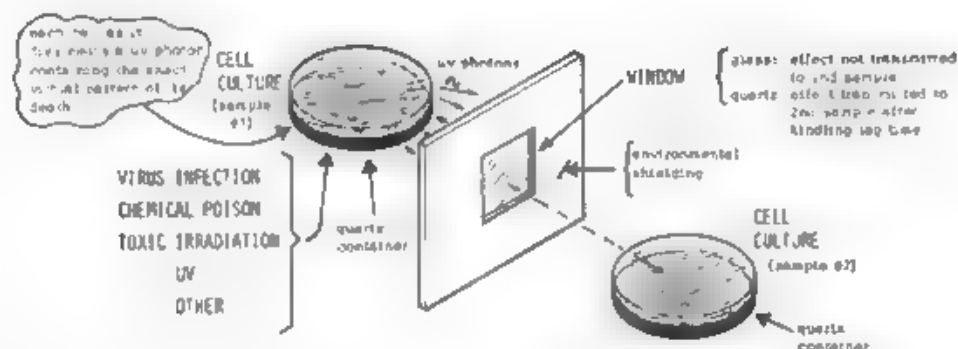


Figure 32 VP Kaznacheev's diagram of the process of 'death transmission' between cells, published in 1976 in English. The two dishes contain portions of the same cell culture placed in two separate quartz containers, and the experiment was done in darkness. As each cell in the cell culture at left dies, he says 'it emits an ultraviolet (UV) photon containing the exact virtual pattern of its death'. A shield with a window is set up between the two dishes of cell cultures. The UV rays pass through the window when it is made of quartz, but not when it is made of glass.

This was exactly what Alexander Gurwitsch had discovered about UV rays in the 1920s, which he called 'mitogenetic rays', and which are now called biophotons. Kaznacheev was thus partially replicating Gurwitsch's original experiment, which we saw earlier, concerning the ultraviolet signals passing between onion roots. These were similarly blocked by glass but permitted by quartz. What Kaznacheev discovered by his experiment was that if the cells in the dish on the left were killed by virus infection, chemical poison, toxic radiation, or some other means, death as if by the same means was paranormally transmitted to the cells in the right-hand dish, as long as the UV rays could pass through the window. He found out later that these death messages also can be transmitted in daylight but much more weakly.

It is not only death that has flashes and signals, it is conception as well. When a human egg is fertilized by a sperm, a light flash is seen. This has been filmed, and many people will have seen the various films of this on YouTube<sup>25</sup> Although the conception flash is ‘ultra-weak’ in the same way that biophoton emissions are, these flashes too are caused by a wave of calcium ions going through the cell. And calcium ion flow is a form of plasma, just as we have seen in the death waves. It seems that 20 per cent of the egg’s zinc is jettisoned upon successful fertilization. Anyone who is interested in this subject should watch the very dramatic moving films of the flashes. Death flashes may not have been filmed yet, but Conception Flashes most definitely have been.

What does all of this mean? We have flashes and signals to do with when physical life begins and when physical life ends. It appears that these are points when our plasma selves activate and deactivate our physical bodies. But what remains constant must be our bioplasma selves. Bioplasma bodies do not ‘wear out’ through physical wear and tear, it is the physical bodies that do that. Whether bioplasma bodies have other, and non-physical, ways of undergoing any kind of disintegration we do not know, but as it could not be physical, it is likely that it would take the form of an impairment or degrading rather than a total catastrophic collapse.

In recent times the development of new technology has given us vantage points from which to see ourselves and our own intelligence in a new light.

AI (Artificial Intelligence) tends to see intelligence in terms of the transmission and processing of information. When it comes to understanding and defining human intelligence, this perspective leads naturally to a focus on the flow of information rather than in the traditional way, which focused on the flow of chemical and biological processes. This school of thought is sometimes called Information Theory, and we will see what great insights it inspires in the next and final chapter.

Traditional digital computers work by considering simple either/or options and sometimes in the case of very powerful digital computers, an immense accumulation of them – the bigger the accumulation the more powerful the computer. The quantum computers currently in development, on the other hand, work on a wholly different level, because they are able to consider many more options than a simple either/or at any one time, and

make multiple calculations simultaneously. And in this they are, of course, very like the human mind. We are able to consider many options at once, which is perhaps why we have free will – in a way that digital computers do not.

Crucial to the development of how these quantum computers work is the way they use plasma – another instance of plasma acting as a gateway for effects to emerge into the macro world.

Are we now able, from the vantage point created by the development of machine intelligence and quantum computers to look at our own evolution and particularly the evolution of our intelligence, in the light of plasma?

In the next chapter, we will expand our understanding of how universal fields not only influence our consciousness, but also help create it. We will also address the issue of consciousness in the Universe as a whole.

## *Our Plasma Selves*

Fields contribute not only energy but information too, information that may play a vital role in triggering intelligence both in humans and in plasmas in space.

We now come to what interests everybody the most, ourselves. Is it possible that we are really much more than we think we are? So much more, in fact, that we transcend our physical bodies even while we are ‘alive’, and after we ‘die’, we are still very much around, just invisible and somewhat out of touch? There is every reason to think so. I have already made plain how rare physical, or atomic, matter is in our plasma universe. So if we have plasma bodies, it is only to be expected. After all, why should we not have plasma bodies? Most things are made of plasma, so why not us? And in this chapter I will advance this argument by describing some more details of what our plasma bodies may be like.

A very interesting angle is provided by information theory and a parallel school of thought called bioinformation. Information theory was first articulated in 1948, with elaborate mathematical precision, by Claude Elwood Shannon (1916–2001).

Building on the work of nineteenth-century logician George Boole (1815–1864), who realized that logic could be used not only as a closed system, but to solve problems in the real world, and working in parallel with another maths genius, Alan Turing (1912–1954), Shannon realized that intelligent machines could be built out of simple logic junctions with binary yes/no answers. Crucially, he saw how these machines might be used as more than just calculators, but as entities that might act in the real world. We can think of this on the model of a thermostat. If information is fed into



it that the temperature of water, for example, has reached a certain level, then the thermostat will 'act' by switching heat on or off

This sort of logic junction can in principle be replicated an infinite number of times, primed with different algorithms according to what its engineer wants to achieve. Increasing the information storage and processing capacity of these machines gave rise to the invention of CDs and mobile phones as well as the Voyager space missions, the development of the internet and of Artificial Intelligence.

But more important for our purposes here is that putting information theory into practice by building intelligent machines helped us to reassess what counts as intelligence. We began to see our own intelligence in a new light, less as a series of chemical reactions and more the processing and communication of information. It also became possible to recognize the operation of intelligence in other areas of the Universe, in plants for instance.

In biology, processes such as growth can be seen as occurring when information encoded in the double helix in the form of DNA is communicated at conception.

The roots of 'bioinformation' go back to 1915, when a Russian scientist named Alexander Leonidovich Chizhevsky (aka Chizhevskii, and also aka Tchijevsky, 1897–1964), aged only eighteen, began a systematic study of the relationship between biological phenomena and large-scale cosmic events. By the age of twenty, he was already lecturing at Moscow University as well as at the Moscow Archaeological Institute. From 1922, however, he concentrated entirely on his biophysics work, and by 1940 he had established by experiments that various cosmic and magnetic phenomena had distinct effects on organisms.

Separately, in 1935, a group of Japanese scientists led by M. Takada showed that the rate of human blood clotting was related to solar activity. This was confirmed by later scientists. All such early work relating to electrical and magnetic influences upon the human body had a big effect on another young Russian scientist named Aleksandr Samuilovich Presman (1909–1985), who devoted most of his life and career to following up on it.

In the course of the book we have looked at hints that fields such as the electromagnetic that pervade the Universe might interact with plasma to create the conditions necessary for intelligence to evolve. There interactions

are not simply a matter of energy, but the communication of information, too. This was Presman's whole study.

After many years of work, study and experimentation, in 1968 Presman published a book so stupendous in its summary of experimental findings by himself, his colleagues, and his predecessors, that it can be described as a classic, a milestone, and a fundamental work of reference. His book was published by the Nauka ['Science'] Press of Moscow, and was instantly spotted in the West, so that an English translation was published in 1970 with the title *Electromagnetic Fields and Life*.<sup>1</sup>

A huge amount of meticulous translation and editing went into this translated book, the English of which is flawless (as I mentioned earlier, this is a very unusual feature for translated Russian scientific works). The publication was made possible by special permission of the USSR authorities. Presman was by this time at the Department of Biophysics in the Faculty of Biology of Moscow University and may also well have had special funding from America, which is not specified. The book is 336 pages long and filled with a bewildering, indeed an overwhelming, amount of detailed information. But it is the last 139 pages of the book that were to have such a powerful impact on what matters most to us, for it was in that section that Presman elaborated this concept of bioinformation within the body in such a vivid manner; it became evident that on that evidence alone, there must be such a thing as bioplasma and hence that there must be plasma bodies also.

Presman said that every human body in the upright position was essentially an ellipsoid—a sort of elongated sphere—for purposes of analysis of currents and fields. Here are his drawings showing what he meant:

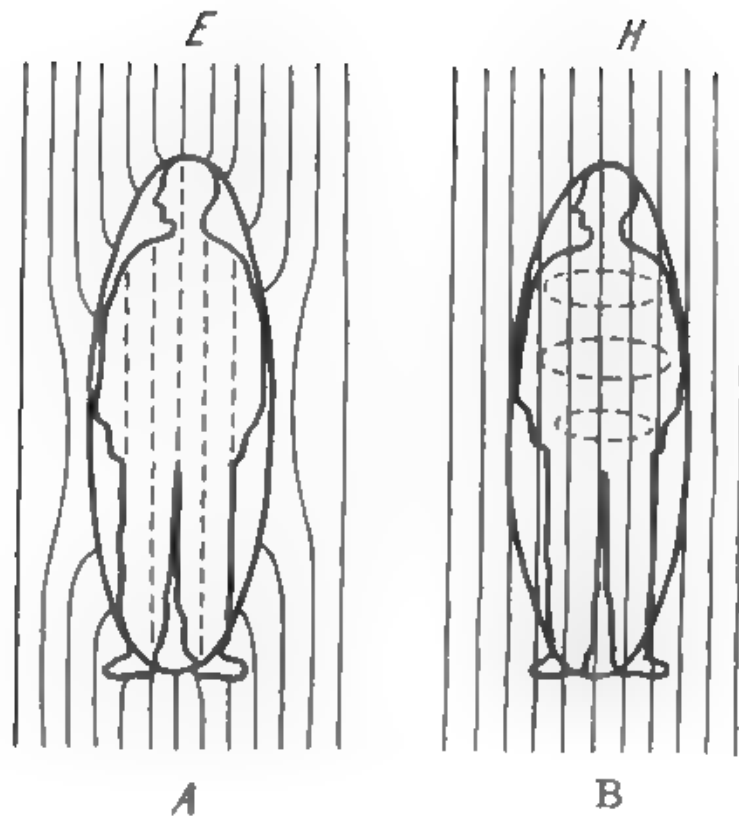


Figure 33 The standing human body is largely composed of electrically conductive water, and acts as an organic antenna, receiving waves and currents from outside and communicating them to the body's interior. It appears standing and therefore as an ellipse for the purposes of Presman's whole-body analyses and studies.

At left the man is standing in a uniform electric field and the dotted lines show the direction of the induced current within the body, which is vertical and hence parallel with the electric field lines. At right, the man is standing in a uniform magnetic field and the dotted lines show the induced current circling within his body is at right angles to the magnetic field lines (Figure 16 from Presman's book *Electromagnetic Fields and Life*, p. 50). As we have already seen, electric fields and magnetic fields are always at right angles to one another. For instance, if a current is flowing along a wire, a magnetic field will be created in a circle surrounding it, in other words it expands at right angles to the current.

Presman says: 'The human body is ... a homogenous (in electrical properties) conducting ellipsoid.' And the major axis of the ellipse is the height of the person. (Naturally, there are countless smaller minor currents

and fields within the human body, and this portrays the body only when treated as a whole and surrounded by an external field )

Shortly I am going to skim through the first portion of Presman's book and give extracts of Presman's comments, stripped of their data and diagrams and equations, so that you can enjoy some vivid glimpses of what he and his colleagues and predecessors had already discovered as early as 1968. Some of what you will read will possibly also horrify you. So, as they say sometimes prior to television broadcasts: sensitive persons might wish to look away now. EmF stands for 'electromagnetic field'

In the Introduction to his book, Presman calls attention to what his studies have forced upon him in order to make sense of his findings:

This has given rise to the need for a fundamentally new theoretical approach to the problem of the biological activity of EmFs – a theory which will not only be consistent with the experimental data but will provide a basis for their interpretation and an elucidation of the particular mechanisms involved

The application of this theory to biology has shown that, in addition to energetic interactions, informational interactions play a significant (if not the main) role in biological processes. Such interactions entail the conversion of information, its transmission, coding, and storage. The biological effects due to these interactions do not depend on the amount of energy introduced into the particular system, but on the amount of information introduced into it. The information-carrying signal merely causes the redistribution of the energy of the system itself and regulates the processes occurring in it. If the sensitivity of the receiving systems is sufficiently high, very little energy is required for information transfer.

It is a valid assumption that all these special features of the reactions of living organisms to EmFs are associated with certain biological systems formed in the process of evolution for the reception of information from the environment. This hypothesis has already received experimental verification.<sup>2</sup>

Information is concerned with tiny bits of information as much as vast amounts. For example, every electron that arrives as a signal is thus a new piece of information, a piece of information not previously possessed.

Presman extended what he stated above, and said that information took precedence also in 'the regulation of physiological processes' within the body, and was crucial for 'informational connections between organisms', by which he means not just signalling between animals but crucially communications between people, whether direct or by distant means.

At this point, we should stop and think again about what is meant here by 'information'. The word is not being used in the traditional sense of 'a collection of facts'. Its use is the more modern and specialized one,

prompted by information theory and relevant to what we now call IT (information technology). And that means that 'information' is being used not solely in the sense of passive information, which is only of use to conscious beings who receive it and make of it what they will, but in the sense of active information, which, when received, triggers an action of some kind, as in the example we saw earlier of the thermostat.

When conceived of in this way, 'information' is another word for 'a signal', or taking it further, as 'an activator', like pulling a switch. All hormones in the bloodstream convey information of this kind, as do our nerves when they sense that the fire is hot and trigger a response of our withdrawing our hands from the hot stove.

Here then are some of the findings of Presman extracted from his lengthy accounts, starting with some important information on the environment in which we live:

In the earth's atmosphere there is an electric field ( $E_e$ ) in a direction normal to [at right angles to] the Earth's surface so that this surface is negatively charged and the upper atmosphere is positively charged. The strength of this field depends on the geographical latitude

Presman realized that he had to try and figure out more about how the body plasma worked and how it received and transmitted information. He made maps of the distribution of surface electrical potential over the body to help him understand what was going on. Here are his maps of the bodies of a lizard and a man:

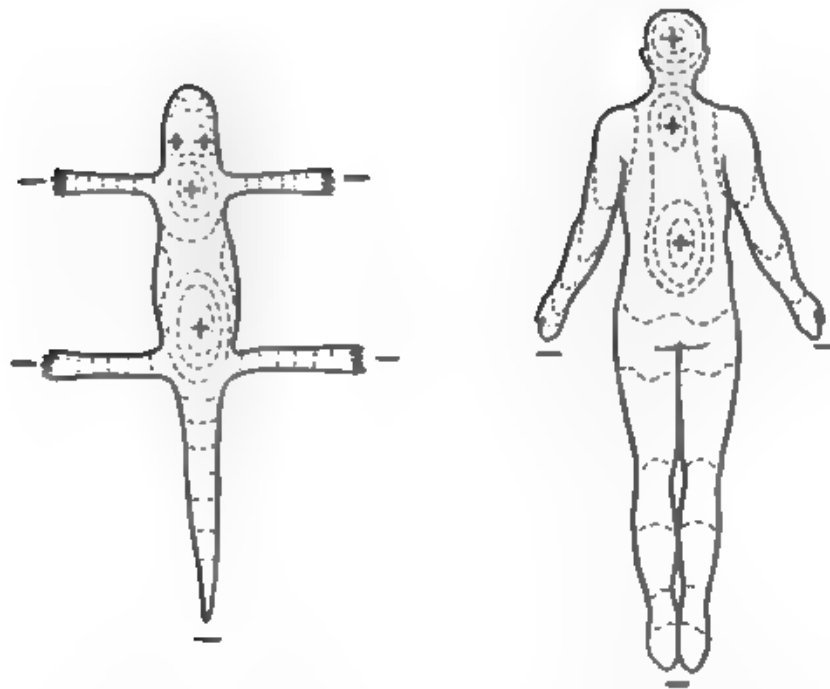


Figure 34 Presman's maps of the distribution of surface electric charge as it occurs on the body of a lizard and the body of a man (From *Electromagnetic Fields and Life*, p 237, fig 93 ) Key points for the man are the brain and the spinal cord

Presman's investigations led him to conclude that DNA molecules are generators of radio-frequency signals and that RNA molecules (one of the four believed to be essential for all forms of life, with a role in coding and decoding genes) are amplifiers of those signals, whereas enzymes and amino acids are effectors of those coded signals. The cell wall he regarded as a noise filter. He believed that at a fundamental level protein synthesis resulted from 'interactions within the organism and its interactions with environmental EmFs'. In other words, electromagnetic fields carry information that activates molecules containing information, which in turn generate signals carrying information, which then trigger life processes within the body.

I cannot emphasize enough that Presman's reconceptualization of biology as orchestrated information flows could not be further from the purely chemical viewpoint. I am aware of how passionately and virulently many biologists hold to their exclusively chemical preconceptions. Through my years of friendship with Peter Mitchell, I heard from him so many times accounts of his twenty-year struggle to overthrow what he called 'the bag of

enzymes school of thought' in biology. Before Peter revolutionized the science, following in the footsteps of Presman, biologists believed that the use of energy in the body was purely chemical. Cells were these 'bags of enzymes' that interacted purely by chemical diffusion.

Peter was able to prove that current flows across membranes were what mattered, and that energy usage had structure and direction – in other words, it transmitted triggering information. And since, as I mentioned earlier, Peter believed that measurements of 'energy' are really records of transactions, his revolution that won him the Nobel Prize was in its underlying premises surprisingly similar to Presman's, though I do not think he had come across Presman's work.

For both Peter and Presman, transactions are essentially information exchange. They viewed bodily signals as the transmission of information. And what Presman concluded was going on was information transmission and reception both within and without every organism by electro-magnetic means.

This brings us closer and closer to the true nature of our plasma selves. In working out the details of this, Presman drew upon the ideas of the Austrian biologist Paul Alfred Weiss (1898–1989), who in turn had drawn heavily upon the ideas of my old friend Joseph Needham (1900–1993) with whom I collaborated on my book *The Genius of China*,<sup>3</sup> and with whom I travelled to China in 1986, the only Western collaborator of his ever to do so.

Weiss was famous for his lengthy book *Principles of Development*.<sup>4</sup> Because of Weiss, Presman was encouraged to ask 'why a free cell, which can extend in so many directions, often advances steadily in one direction to the exclusion of others', and 'how do cells recognize one another?' It was clear to Presman that these were consequences of information transmission within the body. He believed that this was because 'of the existence of diverse interconnections within the living organism by means of EmFs'. And then, having arrived at this view, he turned to the work of Albert Szent-Györgyi for help in figuring out how all this happens. A summary of Szent-Györgyi's ideas has already been given at length in Chapter 14, but the key point here is that Szent-Györgyi viewed the body electronically and insisted that it contained organic semiconductors that modulate and control the current flows and informational signals.

It was at this point that Presman adopted the term bioinformation. He says:

Signals transmitted in the animal world by methods of as yet unknown physical nature have recently been called bioinformation. There are grounds for believing that in several cases such signal transmission is effected by EmFs of various frequency ranges. This is borne out, firstly, by the high sensitivity of animals of the most diverse species to EmFs, and especially by the fact that EmFs can act as stimuli for the elaboration of conditioned reflexes. Secondly, it has been found that people exposed to EmFs experience various sensations and that some animals have special EmF receptors. Thirdly, EmFs of various frequencies have been recorded in the vicinity of isolated organs and cells, as well as close to entire organisms.<sup>5</sup>

At this point, I must bring in the entirely separate work on these ideas of my old friend David Bohm, whose ideas we have already encountered in Chapter 14, one of the most brilliant and original scientists of the twentieth century. An American colleague and close friend of Einstein's when Einstein was in exile in America, David then went into exile himself.

I first met David in London in 1982, and in that same year I published the first autobiographical account of him ever to appear, in the *New Scientist* magazine.<sup>6</sup> David was so shy, he had never been profiled before. It took me ages, assisted by his wonderful wife Saral, to persuade him to let me take his photograph. Saral realized that people found the correct spelling of her name confusing, so she often called herself Sarah Bohm. If it were not for her, David would never have survived his many years of bad health and the horrible stress, anxieties, persecution, penury, vilification, and despair that he went through during his lifetime as an exile, dragging himself from country to country trying to find somewhere to come to rest, which ended up being London.

My wife and I later became very close to the Bohms and saw them many times. David was always desperately ill and Saral was afraid he would die at any moment of his terrible heart ailments. I never knew anyone to take as many pills every day as he did. He had a tea trolley entirely covered with boxes of different pills, and had to rootle through them to find the right ones, which he did while discussing quantum theory.

As a young American scientist, David had been enjoying the prospects of an excellent academic career at Princeton University, where he was a colleague of Albert Einstein, who admired David a great deal.



During the war, David Bohm conducted research into plasma. When he saw the movement of particles in plasma, it struck him that they were behaving in concert in the way living creatures do. It seemed to him that there must be some underlying field or dimension that was interacting with these particles, resulting in life and a form of intelligence.

This vision of intelligence in plasma became a paradigm for David Bohm as he developed a scientific and philosophical account of the Universe that made him a senior figure in the second wave of theoretical physicists in the quantum revolution.

In 1951, he published what many still consider the finest existing textbook on the standard interpretations of quantum theory.<sup>7</sup> But then politics intervened. David's PhD supervisor had been Robert Oppenheimer, who came under political investigation by Congress for possibly being a communist. David was not himself a communist (although he was certainly very left wing), and he did not want to be called before the Congressional Committee to testify against his former supervisor. So he fled America and settled in Brazil. That was the beginning of the rest of his life in exile, with some years spent also in Israel (he and his wife were both Jewish, though non-practising).<sup>8</sup>

It was David Bohm who moved the concept of 'information' forward into a whole new dimension. From the 1980s until his death on 27 October 1992, David continued to elaborate the most revolutionary ideas on this subject. As we have seen, Presman was concerned with biology and biophysics, whereas David was concerned with physics and mind. The key to David's innovation is in his own elaborate and individual concept of active information. Earlier I spoke generally of passive and active information, but that was from my own limited point of view, based upon what seemed to me common sense. It is now time to see what a real scientific genius does when he gets his hands on the idea of active information.

Let us start with this startling remark by David's protégé in this particular field, the Finnish philosopher of science, Paavo Pylykkänen. He says that, according to David Bohm '... not only the behaviour but also the very being of particles [are] based on the activity of information.'<sup>9</sup>

That is a very big claim. It puts active information at the heart of everything.

David's alternative interpretation of quantum theory is often famously known as the causal interpretation. In the classic formulation of quantum mechanics, the interactions of waves and particles have uncertain outcomes. The position and other qualities of particles can therefore only be expressed in terms of probability rather than of certainty. It was thought in the standard view that this will always and inevitably be the case, because it reflects the way the Universe is made.

Albert Einstein was sceptical of this and so was David Bohm. In his formulation, cause and effect holds true in the quantum world as it does in the macro or everyday world, but we cannot calculate results with certainty because we don't have all the information. There are 'hidden variables', and he saw these as being hidden in the information contained in the waves, as the form of a signal. He stressed that form, having very little energy, enters into and directs a much greater energy. It puts form into it, i.e., it informs it; hence, inform-ation. In other words, uncertainty is not a quality of the physical universe. It only arises because we don't have enough information.

David Bohm's interpretation of quantum mechanics, based upon what he called 'hidden variables', is perfectly valid in terms of all experimental results, and the difference between it and the standard view is a difference of interpretation. He first published it in January of 1952, in a series of two papers in the *Physical Review*.<sup>10</sup> Those papers had a big impact upon Louis de Broglie (1892–1987, Nobel Prize for Physics 1929) in France, as a result of which de Broglie also abandoned the 'standard' interpretation of quantum mechanics, with tremendous repercussions in the world physics community, and which greatly added to David's scientific status.<sup>11</sup>

So David's focus on information as the driving force at the heart of the Universe helped throw a startling new light on the central problem of quantum mechanics, which has been a matter of debate and generated a spectrum of views over the last hundred years. To explore further the mind-bending ideas of David Bohm, it is helpful to start by contemplating how a small energy charge can, by the transmission of information, trigger wholesale changes in an entity with much larger energies. Here are some comments he made in a 1987 book:

The basic idea of active information is that a form, having very little energy, enters into and directs a much greater energy.<sup>12</sup> This notion of an original energy acting to 'inform', or put form into, a much larger energy has significant applications in many areas beyond quantum theory.

Consider a radio wave, whose form carries a signal – the voice of an announcer, for example. The energy of the sound that is heard from the radio does not in fact come from this wave, but from the batteries or the power plug. This latter energy is essentially 'unformed', but takes up its form from the information within the radio wave. This information is potentially active everywhere, but only actually active when its form enters into the electrical energy of the radio.

The analogy with the causal interpretation [of quantum mechanics] is clear. A quantum wave carries 'information' and is therefore potentially active everywhere, but it is actually active only when and where this energy enters into the energy of the particle. But this implies that an electron, or any other elementary particle, has a complex and subtle inner structure that is at least comparable with that of a radio – nature may be far more subtle and strange than was previously thought.<sup>13</sup>

A lot of the force of his thinking comes from his focus on what we don't know rather than what we do. He uses his colossal mathematical and scientific imagination to map new territories. Here David is saying that events in the Universe, including at the quantum level, unfold in the way they do because of an exchange of information between fields and particles that may contain a lot of information and mechanisms, which at the moment we have little idea about. In fact, we can scarcely begin to dream about them.

In 1979, the twenty-year-old Finnish undergraduate student at the University of Uppsala in Sweden named Paavo Pylkkänen (quoted above) became interested in David Bohm's ideas. The following year, he was able to meet him at a conference in England. Throughout the early 1980s, Pylkkänen encountered David at other conferences and then in 1984–1985, when he commenced a Masters' thesis at the University of Sussex, he was able to meet and discuss David's ideas with him in greater detail. In 1988, Pylkkänen commenced a PhD course at the University of Helsinki, with the subject being David's interpretation of quantum mechanics and its potential importance for cognitive science (that is, how we think).

In 1990, with grants from Finland, he was able to become 'an academic visitor' at both Oxford and David's own Birkbeck College of the University of London. This made it possible for him to have plenty of conversations with David and with David's closest collaborator and academic friend, Basil Hiley, who was also at Birkbeck. This period coincided with David's publication in 1990 of a brief but essentially final version of his ideas about

how his version of quantum theory related to the functioning of the human mind.<sup>14</sup>

Pylkkänen was thus very much in the right place at the right time. In July of 1992, Pylkkänen completed his thesis and submitted it to the University of Helsinki, only three months before David's death. If David had lived longer, they would probably have written a book together

Pylkkänen's thesis was published in 1992 by the University of Helsinki<sup>15</sup> His abstract at the beginning of the book commences like this:

The first aim of this study is to analyse, evaluate, and extend David Bohm's (1990) theory of the relation of mind and matter, based upon his ontological interpretation of quantum theory [Note: Ontology is a branch of metaphysics dealing with the nature of being. In Bohm's interpretation, uncertainty arises as a problem of perception, not a problem with the nature of reality or being.] The second aim is to consider the relevance of this theory to the philosophy of cognitive science

This interpretation postulates that elementary particles are guided by a field containing active information. Bohm suggests that in certain key ways the activity of information at the quantum level is similar to the activity of information in ordinary human subjective experience, and he uses this similarity as a basis for his mind-matter theory

What Pylkkänen is pointing to here is that Bohm sees some of the bizarre behaviour described in quantum mechanics in the common human experience of consciousness. This is important for the main theme of this book because, as we have already noted, human brains (like quantum computers) contain complex plasma, and plasma may be a medium by which uncertain and bizarre quantum phenomena enter the human experience.

In 2006, Pylkkänen published an ambitious book entitled *Mind, Matter and the Implicate Order*.<sup>16</sup> The 'implicate order' is the phrase that had been used by Bohm for decades to describe aspects of his evolving theories to do with the self-ordering qualities of the Universe, analogous in some ways to Prigogine's ideas of dissipation, which we looked at in Chapter 3. This book carries forward all his thoughts on David's ideas, and his Preface commences like this:

I have been planning to write a book ever since I finished my PhD dissertation in 1992. For various reasons it has taken me a long time to do this. I started writing notes in February 2000.

This book deals with topics that have been variously neglected and even 'forbidden' in academic circles during much of the twentieth century. One such issue is conscious experience, the study of which was famously suppressed in behaviourist psychology and even in traditional

cognitive science, and has only recently become the focus of intense research in a number of fields

Yet another traditionally 'forbidden' topic to be discussed in this book is connected with physics and has to do with the interpretation of quantum theory. To some extent, the suppression of discussion about the meaning of quantum theory is connected with the above-mentioned suppression of metaphysics in general, for quantum theory was initially interpreted in the 1920s in the strongly anti-metaphysical climate of logical positivism – making it 'forbidden' to try to sketch the nature of reality at the quantum level.

I have chosen in this book to focus – strongly – upon David Bohm's views. For it seems to me that Bohm was one of the few twentieth-century thinkers who had a good grasp of not only quantum physics (which was his original field of expertise and which he indeed helped to develop), but also the natural sciences more generally, as well as philosophy and consciousness. He saw the importance of trying to understand the connections between these areas and was indeed developing a new 'big picture'.

Pylkkänen is thus very much the heir to David's ideas linking quantum theory with the workings of the human mind. And again central to those ideas is David's concept of active information.

Let us get down to greater detail of what the active information theory of David Bohm really suggests in relation to quantum mechanics, and why it is vital for the purposes of this book. Pylkkänen says that David and his colleague Basil Hiley in a joint publication had made:

a radical suggestion: the quantum field contains something at least analogous to information. Remember that this is information for the electron, not information for us. Information is seen as an objective aspect of reality and it is thought to be generally active – the first reason to postulate active information at the quantum level is that the effect of the quantum field upon the particle field depends only on the form of the field (the information encoded within it), not upon its amplitude. [Amplitude for a wave is the height of the wave in one ripple, from the bottom to the top of the wave, which scientists ponderously call 'a measure of its change over a single period'.]

The form of the field informs [that is, directs the particle by means of the information it provides] the energy and movement of the particle. This is analogous to the way the form of the radar wave informs the energy and movement of a ship on automatic pilot, the way the form of the DNA informs the activities in a cell and the way the form of a shadow in a dark night can give form to the physiological state of a person who perceives and interprets it [by getting scared].<sup>17</sup>

In other words, David Bohm is arguing that there is crucial information hidden not only in individual particles but also in fields – and that the entire Universe is triggered by the interaction between them.

To put it another way, a particle such as an electron contains a lot of information, some of which is triggered into action when the particle interacts with an underlying field. Of course, scientists already knew that

the behaviour of particles is changed by interactions with underlying fields, but Bohm's supreme mathematical imagination enabled him to suppose that large amounts of information in a simple seeming particle might interact not only with the fields we already know about, but also with another as yet unknown field, another dimension, something that might even be a cosmic intelligence beneath the fields we know about and ordering them. He called this the Implicate Order and he believed and described in the language of science how the Explicate Order, the Universe we see and experience with our senses, could unfold out of the Implicate one.

He understood this unfolding process to work like a hologram, a way of looking at the Universe he shared with his friend and colleague Karl Pribram, whose work we touched on earlier. A hologram is a record of what an object looks like at every angle. In technology we are all familiar with holograms on bank notes and credit cards. They are made up of light beams, which have been organized to act in concert and deflect off the object that is to be depicted, in order to generate information on what it looks like. The same pattern of beams can then be reproduced to create a 3D image of the object even when it isn't there.

An important part of this analogy for our purposes is that if you break a hologram into bits, each bit will contain an image of the entire object. What David Bohm is saying is not only that the entire universe is a hologram, in the sense of being an unfolding of an intelligent 'implicate order' that underlies everything, but that this driving, ordering process is equally present everywhere in the Universe. It underlies our intelligence, the intelligence we see in animals and plants, and the intelligence we saw in the movements of plasma near the start of his scientific journey, which we are now beginning to understand.

David's focus on the information rather than the energy that fields transmit by means of their form brings us to the subject of the work of Rupert Sheldrake. I first met Rupert in 1981, and he and I have been friends now for four decades, as well as my wife Olivia and myself also being family friends of the Sheldrakes (we knew Rupert's wife Jill Purce for more than a decade before we knew him, and their two sons are just as much our friends as their parents are). Rupert and I both knew David Bohm from the early 1980s, but we did not mention it to each other during David's lifetime, and only discovered it later.

Rupert and David were very active together in helping one another with their respective ideas during the years they knew each other, and they took part in conferences together, none of which I attended, alas, as I was very distracted during that period with my work on the history of Chinese science, as a colleague of Joseph Needham. Rupert has published so many books and papers that he is widely known, and it would be impertinent of me to try to summarize his brilliant findings in the field that he calls morphic resonance, which is based upon ‘form fields’.

Rupert’s background was as a biologist, not as a physicist, and he has told me he does not go in for attempting to formulate physics theories. He had hoped that David Bohm could provide the physics basis to explain morphic resonance, but David was unable to do so, despite the good will between them. There is no doubt in my mind that Rupert’s work on the transmission of form by ‘morphic fields’ is connected somehow with Bohm’s transmission of form by ‘the form of the field’ as mentioned a moment ago. And both are involved in the communication of information as form. Rupert’s book *The Science Delusion* (known in America as *Science Set Free*, 2012) is a brilliant analysis of what is wrong with ‘mainstream’ science, as the ultra-conservatives of science like to call themselves.<sup>18</sup>

An interesting description of the invisible soul was given by the French philosopher René Descartes (1596–1650), who called it *une chose qui pense*, which the English philosopher of science Joseph Glanvill (1636–1680) translated as ‘a thinking substance’.<sup>19</sup> This excellent turn of phrase from the seventeenth century is well worth hanging on to. For if I were to find one phrase that I believe sums up the nature of our plasma bodies, as well as the Kordylewski Clouds themselves, it would be to say that those information-laden entities must truly be a thinking substance.

If all entities are essentially plasma entities that from time to time ‘become physical’, or ‘become embodied in atomic matter’, then the thinking substance of each entity will have certain information requirements for survival, and these will vary considerably. There are two extreme cases one can mention. The first is moths, which have the ability to detect a single molecule in the air and trace it back to its flower. A more familiar example is to be found in predatory birds such as hawks and falcons. The fantastic eyesight of these birds enables them to spot tiny rodents such as mice from

extreme altitudes, upon which they then suddenly swoop. The visual acuity of these birds is Nature's rival to modern military satellites, which we are anecdotally informed (and it may even be true) can read a car licence plate from several miles above us.

All of these phenomena display the extremes of information-capture. And sometimes information-capture can occur by paranormal means without even trying, when the desperation of the situation is sufficiently intense. I shall give one example from my own life. During my time as a consultant at board level to the telecoms company Cable & Wireless, my wife Olivia and I and our aged dog Kim, a border collie, shared an office at C&W. Kim lay on her silk eiderdown at Olivia's feet beneath her desk. Animals were supposed to be banned from entry in C&W buildings, and Kim was the only canine intruder who ever evaded this prohibition. But one day a grumpy executive made an official complaint about there being a dog in the lift with him.

The matter was judged to be so serious that it was entered onto the agenda of the next board meeting of the Directors of Cable & Wireless. (Yes, this is true.) The director with whom I was associated was Jonathan Solomon, who unknown to the other directors had written a book about his dog who had died, but whom he had loved beyond all measure. When they reached the item on the agenda where the fate of Kim was to be discussed, Jonathan made an impassioned speech to the board that 'doggies are important', to quote his own words, and the board agreed to permit Kim privileged entry to the building as a result.

This matter of great weight and importance, treated at the same level as corporate acquisitions in Asia and the Caribbean, enabled Kim to remain at Olivia's feet, which was all Kim desired. We at that time had the entire top floor of an office building to ourselves, where we played boules and Kim chased the balls. That floor now holds the executive office of Len McCluskey, the head of the Unite Union, who is doubtless too busy to play boules.

One day we had to use a small closed room protected by a door code, and Kim came with us, as her advice was always needed. The door had been opened for us and the person had left. Olivia and I left the room briefly for some reason and the door closed behind us, leaving Kim locked in the room. Kim by then had very serious kidney issues and needed to drink lots



of water, and her bowl was dry. We were told the only person with the door code might not be back until the next day. We knew that Kim could not live that long without water. No one was prepared to arrange for the door to be forced.

In a moment of intense emotion about the fate of our precious Kim, I forced myself to 'know' the door code, which came into my mind in some manner unknown. I punched it in and the door opened, and we were able to save Kim. This is an example from personal experience of the accessibility of information when truly needed, from a world that is probably entirely constituted of information.<sup>20</sup>

As this book draws near its close, I want to mention a peculiarity about himself recorded in his autobiography by Nikola Tesla. He records this:

In my boyhood I suffered from a peculiar affliction due to the appearance of images, often accompanied by strong flashes of light, which marred the sight of real objects and interfered with my thought and action. I was about twelve years old when I first succeeded in banishing an image from my vision by wilful effort, but I never had any control over the flashes of light to which I have referred. They were, perhaps, my strangest experience and inexplicable. They usually occurred when I found myself in a dangerous or distressing situation, or when I was greatly exhilarated. In some instances I have seen all the air around me filled with tongues of living flame. Their intensity, instead of diminishing, increased with time and seemingly attained a maximum when I was about twenty-five years old.

While in Paris, in 1883, a prominent French manufacturer sent me an invitation to a shooting expedition which I accepted. I had been long confined to the factory and the fresh air had a wonderfully invigorating effect on me. On my return to the city that night, I felt a positive sensation that my brain had caught fire. I saw a light as though a small sun was located in it and I passed the whole night applying cold compressions to my tortured head. Finally the flashes diminished in frequency and force, but it took more than three weeks before they wholly subsided. These luminous phenomena still manifest themselves from time to time, as when a new idea opening up possibilities strikes me ...<sup>21</sup>

Here we find extraordinarily frank descriptions by Tesla of his being tormented over the years by what appear to be the visualisation and perception of his own plasma body. Our plasma bodies would necessarily be like 'tongues of living flame' surrounding us, because that is what plasma is like. By flames we should not, however, imagine flames producing heat, as with the flames of a physical fire. Notice that Tesla speaks of 'living flame', suggesting that he could see pulsations or waves within the flames, so that they appeared as if they were dynamic and 'alive' in some sense.

It is interesting that he sensed 'a small sun' within his brain. The interaction between a plasma body and a physical body would be expected to involve a node of concentrated plasma somewhere within the brain. I cannot resist the impression that Tesla experienced phenomena caused by his physical body being insufficiently insulated from his plasma body, so that he was tormented by overexposure to it. But that, of course, may explain his amazing mental powers of visualisation, invention, and inspiration.

In other words, perhaps great geniuses have an increased access to their plasma selves. Certainly psychics are always complaining of the agonies they suffer from their paranormal perceptions. Physical suffering thus seems to go with 'plasmic phenomena' invading the physical. This is not at all surprising, because of the higher energies involved. This could explain feeling 'a positive sensation that my brain had caught fire'.

It may well be that many of the great geniuses whose stories we have told in this history had a particularly intense relationship with their plasma bodies and that this is what made them visionaries.

To return to the Kordylewski Clouds, Benjamin Schumacher and a colleague named Michael Westmoreland published an important book in 2010 entitled *Quantum Processes, Systems, and Information*. They attempt to define information at the beginning of that book like this:

Information is the ability to distinguish reliably between possible alternatives<sup>22</sup>

As their book moves along, they refine this definition, a journey too detailed for us to follow here, but I would not like people to think this initial statement is where they stop, rather it is where they begin. The authors elucidate information processing at the nanometre scale, and as we will recall, the charged dust particles largely constituting the Kordylewski Clouds are nano-sized. Second, they discuss the complexity of systems needed to generate intelligence, which resonates well with the description by the eminent astrophysicist Wickramasinghe and myself outlined in Chapter 12. Summarizing their findings they say:

We have demonstrated the connection between a complex hierarchical structure and the complex dynamics of the system. The number of hierarchical levels of the system (in our case five) is a measure for the 'homogenous' complexity of the system. The minimum number of

hierarchical levels is a prerequisite in order to realize multi-stability, preparation, measurement, and control, necessary to achieve a complex dynamics which is equivalent to information processing.

Several experts in the new physics of information have made timely comments, which may make claims that everything is essentially information seem less shocking. In 1990, an expert in this field named Wojciech H. Zurek (*zurek* being a favourite Polish soup of mine as well as a common Polish surname) edited a volume of Proceedings of an important conference held the year before. He prefaced it with the sentence: 'The spectre of information is haunting science.'<sup>23</sup>

Two joint contributors to the Zurek volume were Werner G. Teich and Günter Mahler. They gave special attention to 'information processing systems where the basic elements have a dimension of a few nanometres . . . (and) possible realizations in form of semiconductor heterostructures ("quantum-dots") as well . . . They say that their research might be described as molecular electronics'<sup>24</sup> We may be forgiven for feeling a sense of déjà vu here, because this takes us back to our old friend Albert Szent-Györgyi, who was discussed at length in Chapter 14, and his . . . you remember correctly . . . molecular electronics first discussed in a book of his as early as 1957, forty-one years before Teich and Mahler's paper was delivered.

One more paper in the Zurek volume is important for us as well, namely that by Seth Lloyd, who I gather from Google nowadays quaintly describes himself as 'a quantum mechanic'. It is good to know that he can repair nano-sized carburettors and change the spark plugs inside electronic molecules. But what I like most about him is his paper 'Valuable Information' in the Zurek volume. He begins to tell us about the birds and the bees, but in fact the bees are enough:

Information is the currency of nature. A bee carries genetic information contained in pollen to a flower, which in turn supplies the bee with ordered energy in the form of sugar, a transaction that redounds to their mutual advantage . . . a drop of sugar sitting by a pistil [in a flower] registers an amount of information equal to the free energy of the drop divided by the ambient temperature: the drop's information is proportional to its calorie content. When the bee gets sugar water in return for DNA, she is getting a very good deal in food value . . . pollen is low calorie stuff. But the flower is not getting the worst of the bargain.

Although the DNA the flower gains is a diet item compared with the sugar water given up, the information that it contains is of high quality, refined by natural selection through generations, and essential to the flower's ability to reproduce. As a result, the flower places a higher value on the small amount of information in the pollen than on the large amount of

information in the sugar. Value depends not only on the amount of information, but on how difficult that information was to produce.

Down the years, far greater resources have gone into producing flower DNA than the sunlight and soil that went into making today's drop of sugar water. A process such as evolution consists of many interactions and exchanges of information, and the genetic make-up of a species contains, in edited form, information about past interactions between species and environment. Genetic information registers experience.<sup>25</sup>

The scientists concerned with this information theory stress the need for multiple hierarchies of information. The Kordylewski Clouds are capable of intelligence because they are not just simple plasmas, but are dusty complex plasmas. Their interiors are so complex that they can have a number of hierarchical levels limited only by the size of the cloud. (And since the clouds are so gigantic, there could be many millions, or even billions, of hierarchical levels inside them.)

Earlier we talked about voids in complex dusty plasmas such as the Kordylewski Clouds and their role in separating out different 'organs' with distinct functions within the living entity. I want to mention here some revolutionary work on voids, which suggests that voids may have other, more mysterious functions.

In my earlier book *Netherworld*,<sup>26</sup> (known in the USA in a new title bestowed by the publisher there as *Oracles of the Dead*), I discussed at very great length the importance of voids, stressing that the founding father of void studies was the crystallographer Victor Goldschmidt. It was he who identified the crucial importance of voids in otherwise 'solid' physical matter. He discovered that there was such a thing as systematic and highly geometrical void formation in crystals. The voids were very carefully and meticulously formed, and were not at all random. He called these carefully crafted voids 'dissolution forms'. When a dissolution form reaches complete emptiness, it is called the end-body. These voids were found to form 'void lattices', which were the 'empty' equivalents of solid lattices.

As I summarized it:

In other words, with the end-body one reaches the final form of the void lattice, and further action by the solvent merely reduces it in size, but no longer alters its conformation. One has attained the pure void form, or we could call it the substance lattice, traced and outlined by some remaining residues of matter, and which is the yin corresponding to the yang of the material shape.<sup>27</sup>

I cannot repeat here the discussion of void lattices and their crucial importance in both metallurgy and in geology, nor can I elaborate further on Goldschmidt's revolutionary work. But these voids and void lattices are so important in general, because they are manifestations of renewal. They are the destruction-lattices that empty themselves of matter so that the new can be made, as the creation-lattices exhaust themselves and come to the ends of their useful lives. In other words, forms grow and die and are replaced anew from formed emptiness that has grown geometrically and sits waiting to be filled. One is the summer and one is the winter, and rebirth takes place from ordered death in an endless process of birth, death, replacement, and renewal. Without the formation of the voids, this cycle cannot happen.

Since voids form in matter, and plasma is made of matter (just not atomic matter), we can expect that plasma clouds will be riddled with voids. This would certainly apply to the Kordylewski Clouds. These voids would serve the function of assisting in the continual regeneration of the clouds, by replacing exhausted lattices in the plasma crystals and renewing the crystals in an endless progression. Indeed, I wonder if the people working on fusion reactors have ever given any thought to facilitating void formation in their plasmas, which might help in their frustrating search (that has already lasted many decades) for a fusion reactor that works.

They won't get anywhere with a uniform plasma. They have to create voids. Presumably pulsations and harmonic resonance could be employed. The other thing, which I mentioned in Chapter 3, is the need for spaces between things, and voids clearly contribute to that. Empty spaces are needed in any large entity. Something that is completely full cannot work. There always has to be some flexibility.

The first observation of a void within plasma appears to have taken place in a laboratory in 1996, as reported by G. Praburam and John A. Goree. By 1999, several papers appeared that had studied these plasma dust voids. One by Vadim Tsytovich, Sergey Vladimirov and Gregor Morfill proved that the size of the void depends upon the power input into the plasma, and that the greater the power, the larger the void.<sup>28</sup> Goree and Dmitry Samsonov followed with their own paper that year, as did Gregor Morfill, Hubertus Thomas and other leading scientists. So one could say that 1999 was 'the year of the plasma void'.

Subsequent research was relentless after that, and essentially came to a climax under the direction of the brilliant Japanese scientist Osamu Ishihara, who published the above figure.<sup>29</sup> In this paper, written jointly by Ishihara with his colleague Noriyoshi Sato, they said: ‘A void structure, characterized by a dust-free ordered state with a sharp boundary in a dusty plasma, was observed in microgravity conditions [in space orbit] as well as in ground-based laboratory plasmas .. Voids have been observed not only in a complex plasma, but also in colloidal suspensions .. In conclusion, the electrostatic attractive force between like charges in a complex plasma, where charged macroparticles are embedded in a fully ionized plasma, is shown to be responsible for the sharp boundary formation associated with a void ...’

It is interesting to examine how all of this research came to be carried out, especially in light of these comments made by Ishihara in 2008:

Professor Oleg Petrov and Dr Sergey Antipov of Joint Institute for High Temperatures of the Russian Academy of Sciences (former Institute for High Energy Densities, Russian Academy of Sciences), Moscow, Russia, visited our lab [in Japan] from December 22 to 23 2007. We exchanged the detailed information on the experiments of cryogenic complex plasma experiments. We are the only two groups in the world to carry on the cryogenic complex plasma experiments.<sup>30</sup>

Another important development is the report published in August of 2021 in *Nature* that at last a material has been discovered that is a natural ‘topological superfluid’.<sup>31</sup> The implications of this are enormous, and an entire new area has now opened up that relates to our concerns. If only it were possible to discuss this further.

But these matters go way beyond what we have space to consider here.

In the final chapter, we will bring together the arguments to show that plasma in space may well have evolved intelligence billions of years before the evolution of humans.

*Wrapping up the Universe*

As we wrap up the Universe we will consider how parts of the Universe seem to be self-organizing, how complex structures emerge, and how the way things slow down and fall apart – the Second Law of Thermodynamics – is by no means the whole story. Highly unstable charged entities such as dusty plasmas throw out dissipative structures over vast distances. In other words, leading scientists have been looking at the way that there are fundamental tendencies in the Universe towards greater and greater complexity – towards the high levels of complexity necessary for intelligence.

In trying to understand how human consciousness and intelligence works, classical science has tended to concentrate on chemical reactions in the brain. In the second half of the twentieth century, many leading scientists shifted the focus to an interaction between matter and subatomic matter in the brain and external fields, such as electromagnetic fields. It is well established, for example, that birds follow migratory paths by interacting with the Earth's magnetic fields. Could this be one small example of a universal phenomenon?

It is also well established that artificial electromagnetic fields from phone masts can have a deleterious effect on human health and behaviour. But could natural electromagnetism on the Earth and more widely in the cosmos have a much more fundamental, indeed essential role in forming and informing animal and human minds? Plasma's unique sensitivity to fields would seem to make it uniquely suited to this kind of interaction. And we have already begun to question whether there is plasma in the brain.

Similarly in recent times the creation of artificial intelligence and quantum computers have helped prompt new perspectives on human

intelligence and mind in two main ways. AI tends to see intelligence in terms of the transmission and processing of information. When it comes to understanding and defining human intelligence, this leads naturally to a focus on the flow of information rather than the flow of chemical and biological processes (information theory). Unlike traditional digital computers, which work by considering simple either/or options, albeit an immense accumulation of them – the bigger the accumulation, the more powerful the computer – the new quantum computers work much more powerfully, indeed on a whole different level, because they are able to consider many more options than a simple either/or at any one time, and indeed make multiple considerations such as these simultaneously.

(It seems not to have been recognized yet that this operates by means of what I call ‘informational void creation’. When one alternative is chosen over another, this creates an information void in the form of the rejected alternative. However, that void can be filled again by shifting one’s choice to that alternative. With multiple choices taking place, the traditional ‘one’ and ‘zero’ of normal computing can be replaced by ‘empty’ and ‘full’ as concepts, with shifting but parallel geometries of information lattices and information void lattices side by side, continuously changing, the dynamics of these parallel lattices being plotted and manipulated by non-linear equations. This can be studied in reduced form by plotting the mechanisms of memory retrieval. This may sound simplistic, but it is actually the best basis for the construction of a geometry of alternatives in the theory of quantum computing. Someone needs to mathematize it.)

And in this they are, of course, very like the human mind. What makes the development of these new quantum computers work is the way they use plasma – so again we come back to this new way of trying to understand human intelligence and consciousness. Could it be that plasma in the human brain, the human body, has played a vital part in its evolution?

We have seen a great deal of information and learned the life stories of some of the great heroes of science who have brought us this far, despite the fact that many of them were called crazy before they won their Nobel Prizes. Let us now try to bring together a summary of what all of this means.

The first and most important thing is what I have stressed since the very beginning of this book, namely that physical matter is very rare in the



Universe and is not the predominant component of what exists. The obvious conclusion is that if the Universe is full of life forms, including intelligent ones, the majority of them will not be made of physical matter. They will instead be made of plasma. And that may include us. I am suggesting that we are all made of plasma, and that our physical bodies are temporary vehicles for us to operate in the physical world for the short periods of time that our fragile bodies can permit, considering how quickly they wear out, how prone they are to accidents, and how vulnerable they are to disease.

But that has been made amply clear at an earlier stage of this book. What we need to do here is to explore more thoroughly how living entities can come to be in a plasma universe. We are so used to being immersed in a world of physical matter that it is a great struggle for us to free ourselves from the encumbrances of stuff. 'Stuff' is a wonderful word used mostly in America to refer to anything that encumbers one, or gets in the way. On the other hand, 'stuff' can sometimes be useful. It is because 'stuff' has no actual definition that it can be used so readily as an idea.

So let us free ourselves from our physical 'stuff' and let our minds roam free.

It is unavoidable to conclude that if the Universe is made of 99.9 per cent plasma, then life forms in it must also be 99.9 per cent made of plasma. So we need to understand such life forms urgently.

It is indeed difficult for us, being what we are (or should I say, being what we think we are) to imagine that a diffuse charged dusty plasma cloud could possibly be a living being. But what if you were such a cloud and saw us? You might think: 'what thick, clumsy, awkward objects those things are that move upon the Earth! I wonder if they could possibly contain any elements of life in them. They may simply be moving lumps of protoplasm with four protrusions sticking out like viruses have, and everyone knows that viruses are not alive.'

Everything depends upon dust. This sounds so inglorious that it is difficult to grasp, because we are used to thinking of house dust and the need to clean the house, and also in my case to dust my books. But in order for a plasma to come alive, it needs dust. It gives the particles something to cling onto. Ten thousand electrons can cling to a single dust particle. So when you consider how many dust particles there are in a dusty plasma cloud, and if you imagine 10,000 electrons attached to each one, giving

each dust particle the electric charge of 10,000 electrons, gigantic electric charges beyond any power station or power network on Earth can gather in a single cloud. The huge electromagnetic forces of the clouds are inconceivable to our tiny little minds, and even the bravest equation trembles at the thought of the number of exponents appearing in it, each one carrying so many zeroes, it is enough to make a person faint.

So we get it: things are different in space.

One key to all these clouds coming alive is also in the supply of ready food. For plasma entities, that means a reliable flow of particles. Plasma clouds eat particles, in the way that whales eat plankton. Please note that whales are the largest mammals on Earth, but they eat the smallest food. Plasma clouds may be huge, but they too can eat their own 'space plankton', namely charged particles and ions.

And it so happens that suns and stars are, as the English say, 'just the ticket'. For they are spewing out particles continuously, and one aspect of this has been known for a very long time. I am referring to sunlight as the source of energy for plants. If plants can eat sunlight, then why can't plasma clouds do so too? Of course, I am not suggesting chlorophyll in plasma clouds, I am suggesting the absorption of energy from the particles consisting of the solar wind.

The huge electromagnetic forces in the charged clouds are so much more powerful than gravity that they suffice to hold everything together, even if the cloud is extremely diffuse. We must never forget that electromagnetic forces are more powerful than gravitational ones by a factor of 10 followed by 39 zeroes. We should therefore never underestimate the power of electromagnetism to hold things together, a perpetual embrace.

Now we can see that it is not difficult to conceive of these large, charged, dusty plasma clouds becoming things.

How do they become living things?

We have examined the anatomy of complex dusty plasma. At this point I would like to refer the reader back to what I wrote in Chapter 12 about how the 'electromagnetic strength' of the Kordylewski Clouds could arise, which holds them together. I explained how spinning dust grains like incredibly small rice grains (which range in size between a micrometre, which is one millionth of a metre, and a nanometre, which is one thousand times smaller than that), each with a north pole and a south pole, can

collectively by their spinning generate gigantic amounts of energy. They are like billions upon billions of microscopic power generators. And it is these that generate the energy which creates the structure and internal organization of the cloud.

We have seen they do in fact become filled with crystalline structures like the structures in organic life, double helixes capable of storing information, filaments to conduct currents like nerves in animal bodies, semiconductors capable of acting as Josephson Junctions in the same way these things work in animal bodies, voids that separate different organs enabling them to perform different functions within an overarching system, as our organs do in our bodies.

You can have a hot pocket next to a cold pocket, and they will not disturb one another. Much of the cloud in space needs to contain superconductive currents, and that is easier at low temperatures, in what is called a cold plasma. But because of sheaths, you can have all that going on at cold temperatures, while at the same time having internal sheathed pockets and currents operating at extremely high temperatures.

We have also seen that the voids have regenerative capacities. We have seen that these plasmas contain seething patterns of interacting fields and currents and that these are driven to very high levels of complexity by interactions with complex dust within. There may be as yet barely understood particles involved in this drive to create complex patterns such as magnetic monopoles and tachyons.

We have looked at various theories to explain how the drive to complexity arises in the Universe as whole, and which may be pertinent to the evolution of life in plasma. We looked at Prigogine's theories of dissipative structures. There are theories of emergence and self-organization, which describe how complex things grow spontaneously and unpredictably so they become greater than the sum of their parts. And we looked at David Bohm's theory of the Implicate Order, of an ordering faculty that lies beneath the universal fields we know about.

How might complex dusty plasmas be intelligent—like plants, humans or quantum computers are intelligent?

The light that information theory throws on the nature of intelligence shows that plant life can be extremely intelligent and that plasmas may be intelligent in the same way. Plasmas compete for food, so there may also be

a survival of the fittest factor driving their evolution. Like intelligent entities, plasmas may cooperate as well as compete, so that long-range-order events may involve not only communication but cooperation in the process of achieving the complexity necessary for intelligence. We have seen that ball lightning, which is made of plasma, often behaves in an intelligent manner.

We have seen that the role plasma plays in helping our own intelligence to evolve and function at high levels may also play out in plasmas in space, and that conditions may have been right for this billions of years before conditions became right for the evolution of life on Earth.

I am also suggesting that the predominant forms of life in the Universe are inorganic. The organic life forms of our planet are a footnote, not the main text, of the message of the Universe.

Just as information theory and the invention of digital computers caused us to reassess the nature and potential of intelligence, so too the development of quantum computers has opened up new horizons. Quantum computers contain plasma to help harvest the weird phenomena of the quantum realm in order to generate intelligence far greater than any digital computer. Complex plasmas also have these properties. We have seen ball lightning move through solid objects, which is an example of the phenomenon of quantum tunnelling happening in the macro world.

We have seen gigantic filaments made of plasma carrying superconducting currents with energy and information. We have seen that these plasmas contain elements that work like Josephson Junctions, used to control and fine-tune the flow of energies and information in machine intelligence, so they may have intelligence we can hardly begin to imagine.

But we have also seen that our bodies have many of the plasma features and that in addition to our meat bodies, we also have plasma bodies, and these interact with universal fields. What does this say about our own potential intelligence?

More and more is being discovered about how the human brain works. We now know that individual neurons are not the elements of the brain, it is groups of neurons that are. And these in turn operate both in parallel and in a distributed sense (in other words, not solely in one area of the brain, but distributed across regions of the brain). This kind of brain processing is called parallel distributed processing. Another name for it is connectionism.

(I have written about this at very great length in another book, so cannot repeat it here.)<sup>1</sup>

What is important for our purposes here is that intelligence emerges from the human brain not by chemicals next to each other interacting by physical proximity, but by connections over a distance. Similarly it is the concept of long-range order that is crucial to the integrity of any plasma cloud in space. This is what occurs when a very large collection of disparate particles suddenly comes together and forms a coherent entity, which extends its central control over a long distance, somehow imposing long-range order. This goes against a lot of 'conventional thinking', because it suggests action at a distance.

Isaac Newton became nearly hysterical when people spoke of action at a distance. In *Principia Mathematica* (1713), he called it 'a philosophical absurdity'. Albert Einstein was puzzled by it and called it 'spooky action at a distance'. He and two colleagues formulated a famous concept in physics called the EPR Paradox (the 'E' being for Einstein and the 'P' and the 'R' being for the other guys). This was published in 1935 and dealt with particles coordinating their momenta when very far apart, so far in fact that they would have to exchange the information with each other by sending signals at greater than the speed of light. Since Einstein himself developed Special Relativity, which insists that the speed of light must be a universal constant that cannot be exceeded, he had a special interest in this unsolved paradox of physics. I myself have entered the Special Relativity debate on the side of the speed of light as co-author of a paper with my friend Otto Rössler, which was a great honour, because he is one of the world's most famous chaos theory scientists, and the discoverer of the Rössler Attractor.<sup>2</sup>

The phenomenon of non-locality, as they call it, which was raised by this paradox, has so far been proved to occur over distances of fifty kilometres, and the phenomenon is no longer denied. A special case of non-locality is the now-fashionable subject of quantum entanglement. Entanglement has become a buzzword. What it means is that at the microscopic quantum level, things far apart can still be in contact, in other words can be 'entangled' with each other and interact. And the point about a huge plasma cloud that becomes an entity through coherence achieved despite non-locality is that it elevates the quantum state from the microscopic to the

macroscopic, in other words from the tiny to the huge. The entire cloud becomes a macroscopic quantum entity.

So how is it possible for quantum phenomena to operate at these huge sizes? We were told for decades that quantum phenomena occurred only at microscopic levels. But things have now changed

I suspect that the answer to all this is what I discussed earlier, namely active information. Information does not have any energy or any mass. It is thus immune to the speed of light restriction, which applies only to matter, waves, and so forth. In order to extend across vast distances, information can exceed the speed of light quite happily without breaking any 'laws'. A distributed information network would act as a unifying factor to enable the cloud to achieve stability as an entity. In fact, the vast amount of information in itself might knit a filamentary network of connected elements constituting a brain, in which information processing would be inevitable.

As David Bohm and his close colleague Basil Hiley stated in 1993:

We have seen that nonlocality is contained in all the interpretations of the quantum theory that we have discussed so far (and) our own ontological interpretation also contains nonlocality as a basic feature.<sup>3</sup>

'Long-range order' is an example of one of the outcomes that entanglement generates. This extraordinary phenomenon means that particles or things very far apart indeed can be closely coordinated and can behave as if they are all part of one centrally controlled organism. This is what is known as quantum entanglement, which we have already mentioned.

Sometimes a system can suddenly undergo a change, known in the jargon as a phase transition, and millions of apparently separate things in the system instantaneously begin to act as one. Imagine one million people sitting in bars and pubs around the world drinking casually with their friends, and suddenly at the same instant they all stand to attention and give a salute, even though they do not know one another, have never met and never will meet. This is a phase transition, and is also referred to as the sudden onset of long-range order. No one is entirely sure how these things can happen in the natural world, but they do. And we now know that this form of coherence by means of long-range order can happen within plasma

crystals. This means that both information and energy can come from far away

Because of entanglement, not only can parts of giant dusty complex plasmas communicate with each other and form coherent patterns over distances, but giant dusty complex plasmas at the opposite sides of the Universe might in principle cooperate in the evolution of their intelligence.

## *Conclusion*

We have seen in this book that the Universe is over 99 per cent plasma.

We have seen that dusty complex plasma interacting with electromagnetic fields can evolve sufficient complexity to count as 'alive'

We have seen too, in certain cases, that complex dusty plasmas contain such high levels of complexity, including quantum phenomena, that it may reasonably be speculated that they are also intelligent. The Kordylewski Clouds hovering over the Earth may well be vastly more intelligent than human beings, or indeed all human beings put together, including all of those who have ever lived, so vast are the potential computing powers of the huge clouds, which together are nine times the size of the Earth, so that in size they dwarf our planet and its moon.

We have seen that plasma may be a medium by which the bizarre behaviour of particles and waves in the quantum realm may erupt into the human or macro realm, for example in the manifestation of lightning balls

We have explored the role of plasma in the human body, showing that we may have a plasma body that shapes and sustains our physical body. We ourselves are in a sense plasmoids, and our dense matters bodies made of those rare things, atoms, are like 'smart overcoats' that we discard when we die.

The quest has only just begun. This book is intended to inform you of what is possible. Once you grasp this, you can begin to realize what you really are



# Notes

## Chapter 1: The Discovery of the Clouds

- 1 Kazimierz Kordylewski, *Acta Astronomica*, 11, 1961, page 165
- 2 Judit Sziz-Balogh, András Barta, and Gábor Horváth, 'Celestial Mechanics and Polarization Optics of the Kordylewski Dust Cloud in the Earth-Moon Lagrange Point L5, Part I Three-Dimensional Celestial Mechanical Modelling of Dust Cloud Formation', subsequently followed by an Erratum and by a Part II 'On Imaging Polarimetric Observation for the Existence of Kordylewski Dust Cloud' These were all in the *Monthly Notices of the Royal Astronomical Society*, 480, 2018, 5550, and 482, 2019, 762–70 In summarizing their observations, the conclusion of this astronomical team for Part II was '... the only explanation remains the polarized scattering of sunlight on the particles collected around the L5 point.'
- 3 Robert Temple and Chandra Wickramasinghe, 'Kordylewski Dust Clouds: Could They Be Cosmic "Superbrains"?', in *Advances in Astrophysics*, Vol. 4, No. 4, November 2019, pp. 129–32

## Chapter 2: Exploring the Nature of Plasma Clouds and Their Energy

- 1 Wang Zhehai, et al., 'Physics of Dust in Magnetic Fusion Devices', in Padma Kant Shukla, Lennart Stenflo, and Bengt Eliasson (eds.), *New Aspects of Plasma Physics*, Proceedings of the 2007 ICTP Summer College on Plasma Physics, World Scientific, Singapore, 2008, pp. 395–6
- 2 Ions were recognized soon after we learned about the existence of atoms In 1834 the British chemist Michael Faraday identified and named this new subdivision of matter 'things which were 'almost atoms but not quite' Because these tiny particles were detected travelling from one electrode to another in aqueous solutions, and because the act of going between things seemed to be their main characteristic at that time, Faraday looked for a Greek word to do with going or travelling He chose the Greek verb *ienai* (a form of *eimi*), which means 'to go, come to, go across, go (along a road)', the neuter present participle of which was *ion* And so he called them 'ions'.
- 3 The definition of a qudit is a bit complicated Such a unit is considered to be a 'unit of quantum information by a superposition of  $d$  states, where  $d$  is an integer greater than 2' That explains what the ' $d$ ' in qudit stands for
- 4 Osamu Ishihara, 'Final Report on Study of Cryogenic Complex Plasma' submitted on 27 October 2008 to the US Research Laboratory in Japan known as AOARD, declassified by the US Department of Defense and included in the publication entitled *Charged Colloidal Structures in Plasmas*, no date In his experiment, Osamu first created the plasma in his lab and then injected the dust particles into it, hence his particular emphasis of the interaction of the two components.

## Chapter 3: A Brief History of Plasma Research

- 1 In 1875, Crookes invented the vacuum tube, which came to be known as ‘Crookes tubes’. You might say that we owe the entire electronic age to him. The original radios and television sets were full of those odd vacuum tubes. (In Britain they were commonly called ‘valves’.) When one ‘blew’ it had to be replaced, like a light bulb, and if it were only in the radio, you would go to a radio parts shop and there would be shelves full of little thin cardboard boxes of different sizes. The man would rummage through his shelves and find the right one, take it down and hand it to you, saying ‘Here you are, this is the one you want.’ Most people simply replaced the radio ones themselves. But it was more hazardous to open a television set, thanks to the dangers of possible electrocution, so the television repair men would come to replace the tubes in those, because they knew how to open TVs and handle the tubes safely. Even well into the 1970s, it was still possible to find valves (vacuum tubes) in small shops in most towns and buy them easily. In the 1990s, my wife Olivia and I wanted to keep an old radio set from the Second World War working and we succeeded in finding the right valve.
- 2 Nikola Tesla, *My Inventions: The Autobiography of Nikola Tesla*, Cosimo Classics, New York, 2011, p. 80. The work was originally published in February, June and October 1919, in installments in a journal entitled the *Electrical Experimenter* (an American technical science monthly established in May 1913).
- 3 Irving Langmuir and Lewi Tonks, ‘Oscillations in Ionized Gases’ in *The Physical Review*, Second Series, Vol. 33, No. 2, February 1929, p. 196, footnote 5.
- 4 David Albertovich Frank-Kamenetsky (aka Kamenetskii), ‘Plasmic Phenomena in Semi-Conductors, and Biological Effects of Radio Waves’, in *Proceedings of the USSR Academy of Sciences* [*DAN or Doklady Akademii Nauk SSSR*], Vol. 136, No. 2, Moscow, 1961 (Presumably in Russian.) In 1963, he published a bold book insisting that plasma was the fourth state of matter (fourth after the gaseous, liquid, and solid states, which had been the traditional three states of matter until plasma was discovered). David Albertovich Frank-Kamenetsky (aka Kamenetskii), *Plasma – der Vierte Aggregatzustand*, Progress Verlag, Moscow, 1963.
- 5 Gary S. Selwyn, J. Singh, and R.S. Bennet, ‘In Situ Laser Diagnostic Studies of Plasma-Generated Particulate Contamination’, in *Journal of Vacuum Science and Technology*, A, 7, pp. 2758–65.
- 6 ‘Like complex fluids, complex plasmas belong to the group of so-called soft matter. Originally the name “complex plasma” was chosen in analogy to “complex fluids”, since complex plasmas can be regarded as the fourth state of soft matter, very much like ordinary plasmas can be regarded as the fourth state of ordinary matter. They are responsible for fundamental astrophysical processes such as the formation of the solar systems and planets. In particular, the question about the structure of self-organized systems emerges as a key issue.’ Patrick Ludwig, Michael Bonitz, and Jürgen Meischner, ‘Complex Plasmas’, in Michael Bonitz, Norman Horing, and Patrick Ludwig (eds.), *Introduction to Complex Plasmas*, Springer Verlag, Heidelberg, 2010, pp. 6–8. In the quote under bullet 2010, soft matter was referred to, and that dusty complex plasmas were types of soft matter. So what is soft matter?

There is a useful book on just this subject by Masao Doi (*Soft Matter Physics*, Oxford University Press, 2013). His very first chapter is entitled ‘What is soft matter?’, in which he says

Soft matter includes a large variety of materials, typically composed of polymers, colloids, liquid crystals, surfactants [such as detergents and emulsifiers], and other mesoscopic [intermediate-sized, in other words between nano scale and micrometre scale] constituents.

Condensed states of matter are usually classified into two states, the crystalline state where the molecules are ordered, and the liquid state where the molecules are disordered. For certain materials, molecules form a semi-ordered state between crystal and liquid. Such materials are called liquid crystals. As we have seen, soft matter includes a large class of materials. What is common in the above materials is that they all consist of structural

units that are much larger than atoms – soft matter consists of large molecules or assemblies of molecules which move collectively – the fundamental structural units of soft matter are very large.

- 7 News item ‘Bacterial Mimic Spins and Swarms’ in *Nature*, Vol 575, No 7784, 28 November 2019, p 568.
- 8 Torben Ott, Patrick Ludwig, Hanno Kählert, and Michael Bonitz, ‘Molecular Dynamics Simulation of Strongly Correlated Dusty Plasma’, in Michael Bonitz, Norman Horing, and Patrick Ludwig (eds ), *Introduction to Complex Plasmas*, Springer Verlag, Heidelberg, 2010, p 232 (Figure 10.1).
- 9 Hamish Gordon, et al , ‘Causes and Importance of New Particle Formation in the Present-Day and Pre-Industrial Atmospheres’, in *Journal of Geophysical Research Atmospheres*, 122 (16), 2017, pp. 8739–60
- 10 Robert Wagner, et al , ‘The Role of Ions in New Particle formation in the CLOUD Chamber’, in *Atmospheric Chemistry and Physics*, 17, 2017, pp. 15181–97.
- 11 Dominik Stolzenburg, et al , ‘Rapid Growth of Organic Aerosol Nanoparticles over a Wide Tropospheric Temperature Range’, in *Proceedings of the National Academy of Sciences of the USA* (colloquially known as ‘PNAS’), Vol 115, No 37, 11 September 2018, pp 9122–7  
Winkler’s Appendix to this paper may be separately obtained by download from the PNAS website
- 12 Christina J Williamson, et al , ‘A Large Source of Cloud Condensation Nuclei from New Particle Formation in the Tropics’, in *Nature*, Vol 574, No 7778, 17 October 2019, pp. 399–403
- 13 The ancient Greek mystics when discussing what mystical writers such as the Theosophists call ‘the subtle body’, in other words the soul, called it the *lepton ochēma* in the ancient book called *The Chaldaean Oracles*, the word *ochēma* meaning not ‘body’ but ‘vehicle’ This use of the word *lepton* gives it an extended meaning, which one could call ‘lighter than light’, since lightness has here been stretched to mean so light that it is barely material at all (Or one might say it was their way of trying to give a name to what we call plasma, the existence of which they intuited but did not yet understand ) The name *baryon* was thus invented to describe the particles that were very different from electrons, such as protons and neutrons, and which are so much heavier than electrons, having so much more weight, or as one might more correctly say, rest mass The proton, for instance, has 1836 times more rest mass than an electron, is thus heavy, or as the Greeks would have said, *barys*, ‘weighty’ In 2016, I published a lengthy paper explaining why protons are exactly 1836 times heavier than electrons, which people interested in more detail on this subject can download from my [www.researchgate.net](http://www.researchgate.net) entry, as my explanation was entirely new and had never been suggested before There are very many types of baryons known now, but we cannot go into such a complicated discussion or give the lengthy lists of them here The name baryon comes from the ancient Greek word *baros*, which means ‘weight’ Electrons are small, fast, and light, and they are in a different class of particles known as leptons, from the ancient Greek word *leptos*, which means ‘small’ and also ‘light, as in faint breezes and light wine’ Coincidentally, the Greeks also used *lepton* to describe the size of dust particles
- 14 T D C Bevan, et al , ‘Momentum Creation by Vortices in Superfluid  $^3\text{He}$  as a Model of Primordial Baryogenesis’, in *Nature*, Vol 386, No 6626, 17 April 1997, pp 689–92
- 15 Vadim Nikolaevich Tsytoich, Gregor Eugen Morfill, Vladimir E (Yevgenyevich) Fortov, N G Gusein-Zade, Boris Aleksandrovich Klumov, and Sergey Vladimirovich Vladimirov, ‘From Plasma Crystals and Helical Structures towards Inorganic Living Matter’, in *New Journal of Physics*, Vol. 9, 2007, pp. 263ff. (11 pp )
- 16 Sadrudin Bankadda, Vadim Nikolaevich Tsytoich, Sergey I Popel, and Sergey Vladimirovich Vladimirov, ‘Self-Organization in Dusty Plasmas’, in Yoshiharu Nakamura, Toshiki Yokota, and

- Padma Kant Shukla (eds ), *Frontiers in Dusty Plasmas*, Proceedings of the Second International Conferences on the Physics of Dusty Plasmas 1999, Elsevier, Amsterdam, 200, pp 123–34
- 17 Vadim Nikolaevich Tsytovich, 'Evolution of Voids in Dusty Plasmas', in *Physica Scripta*, Vol 2001, T89
  - 18 Vadim Nikolaevich Tsytovich and Gregor Eugen Morfill, 'Non-linear Collective Phenomena in Dusty Plasmas', in *Plasma Physics and Controlled Fusion*, Vol 46, No. 128, B527
  - 19 Vadim Nikolaevich Tsytovich and Gregor Eugen Morfill, 'Non-linear Collective Phenomena in Dusty Plasmas', in *Plasma Physics and Controlled Fusion*, Vol 46, No. 128, B527
  - 20 Sergey Vladimirovich Vladimirov, 'Dynamic and Static Structures in Dusty Plasmas', in *Plasma Physics and Controlled Fusion*, Vol 49, No. 5A, S20
  - 21 Vadim Nikolaevich Tsytovich, Gregor Eugen Morfill, Vladimir E. [Yevgenyevich] Fortov, N. G. Husein-Zade, Boris Aleksandrovich Klumov, and Sergey Vladimirovich Vladimirov, 'From Plasma Crystals and Helical Structures towards Inorganic Living Matter', in *New Journal of Physics*, Vol. 9, 2007, pp 263 ff

## Chapter 5: Great Balls of Fire

- 1 Mark Stenhoff, *Ball Lightning: An Unsolved Problem in Atmospheric Physics*, Kluwer Academic and Plenum Publishers, New York and Dordrecht, 1999
- 2 C. [Cecil] Maxwell Cade and Delphine Davis, *The Taming of the Thunderbolts: The Science and Superstition of Ball Lightning*, Abelard-Schuman, London, 1969
- 3 And because ball lightning has often been associated with poltergeist phenomena, and poltergeists have so often been associated with the strange emotional energies of teenage girls, it seems to me that it is not impossible that poltergeist-related ball lightning might be created by intensely neurotic teenage girls' own abnormal energy fields
- 4 I have no view on the matter. Robots can certainly be organic. Clunky metallic robots are a childhood fantasy. It is possible that the proponents of 'transhumanism' know all of this very well. After all, I suspect that DARPA is well aware of what I am suggesting. And they probably assume that the clouds are hostile, if only because DARPA assumes everyone and everything is hostile. It is, after all, the job of the security agencies to be paranoid. And they certainly do not let us down in that. Plus, there's a lot of psychosis thrown in. When you get a paranoid psychopath, then you have the real thing, the perfect security agent.
- 5 Stanley Singer, *The Nature of Ball Lightning*, Plenum Press, New York and London, 1971 (reprinted 1972 and 1978), James Dale Barry, *Ball Lightning and Bead Lightning: Extreme Forms of Atmospheric Electricity*, Plenum Press, New York and London, 1980, Mark Stenhoff, *Ball Lightning: An Unsolved Problem in Atmospheric Physics*, Kluwer Academic/Plenum Publishers, New York, 1999
- 6 Yoshi-Hiko Ohtsuki (ed.), *Science of Ball Lightning (Fire Ball)*, Proceedings of the First International Symposium on Ball Lightning (Fire Ball), 4–6 July 1988, World Scientific Publishing Company, Singapore, 1989. The paper by Singer and Barry is 'Ball Lightning – the Continuing Challenge', pp. 1–18
- 7 Paul Sagan, *Ball Lightning: Paradox of Physics*, (Universe, Inc., New York, Lincoln, Nebraska, and Shanghai, 2004. The book is copyright by Paul Smigler, and it appears that Paul Sagan is a nom de plume (the book is dedicated to Carl Sagan, which may be relevant to the choice of nom de plume), I have been unable to make an unambiguous identification of this author.
- 8 Ibid., p. 284.
- 9 Abrahamson, John (ed. and contrib.), *Ball Lightning Theme Issue, Philosophical Transactions A of the Royal Society*, London, 2002. (Contains contributions by John Abrahamson, Alexander Vladimirovich Bychkov, Vladimir L. Bychkov, Celia I. Merzbacher, Stanley Singer, and D. J. Turner)

- 10 Some of their interesting scientific ideas about ball lightning will come into our discussion later in connection with the nature of complex plasmas. I shall not even attempt to summarize the contents of this fascinating book, as it would take too long, except to point out that it consists of contributions by six separate scientists of high repute, and should be studied carefully by anyone intending to study ball lightning.

The other source I should mention appeared piecemeal during 2015, and consists of a series of booklets in English translation by two Russian scientists of the Institute of Informatics Problems of the Russian Academy of Sciences in Moscow, named Vladimir Pavlovich Torchigin and Alexander Vladimirovich Torchigin. Vladimir Torchigin is the head of the Department of the Problems of Design of Information Computing Systems of High Parallelism at his Institute. Alexander Torchigin is the son of Vladimir Torchigin, as is a third Torchigin at the Academy, who has not written about ball lightning, Sergey Vladimirovich Torchigin. The English translations are grammatically imperfect in many places, and one must make allowance for that fact in reading the booklets.

In one of their booklets, the two Torchigins point out that there have been more than 2000 papers and reports about ball lightning published, containing more than 200 theories of what ball lightning is, and then they say 'But none of these theories seems to have gained general acceptance because they fail to explain all observed characteristics of the phenomenon.' They also mention that as little as 20 years ago some scientists still doubted the existence of ball lightning. However, they point out that as there are now more than 10,000 recorded accounts of ball lightning, there can be no doubt that it exists! (Vladimir Pavlovich Torchigin and Alexander Vladimirovich Torchigin, *Clue of Ball Lightning Puzzles: Ball Lightning Is the Light Rather than Matter*, no publisher named so privately published, 2015, pp. 5–6.)

The word 'the' in the title is an example of the imperfect grammar of the text. Errors with the use of definite articles are perhaps the single most common error made by non-native translators into English. The theories of Vladimir Torchigin are very interesting and novel. He believes that ball lightning is made out of trapped light rather than plasma. However, he says (and I have slightly improved his grammar) 'there is usually no plasma within Ball Light after its generation. There is certainly no plasma after Ball Light penetrates through windowpanes because plasma cannot penetrate through glass.' (Vladimir Pavlovich Torchigin, *Ball Lightning Physics: No Plasma and Electricity Are Required*, no publisher so privately published, 2015, p. 198.)

Torchigin is erroneous here, but may be forgiven for not knowing about the most recent findings, which are known only to a small number of scientists at the moment. The latest discoveries about complex plasmas are so astounding that we now know that they can indeed penetrate not only glass but any form of solid dense matter. I wish to make the point that the Torchigins have done a good service by discussing confined and trapped light within the context of ball lightning. As we will see later, the creation of 'a new kind of light' and the 'confinement of light' have now both been accomplished in the laboratory, and ironically, the most exciting part of this work has taken place recently in Russia, though because it is known to such a small number of specialists, it is not yet known to the Torchigins.

We will see later when we come to the full explanation of complex plasmas, which is what I believe that we all are as living entities, that the instinct followed by the Torchigins in attempting to explain ball lightning as confined light without the presence of any plasma is useful and has important and indeed essential insights to offer, because 'confined light' is indeed part of the answers we are seeking, but within the contexts of highly complex plasmoids.

- 11 Pyotr Leonidovich Kapitsa, 'O Priroda Sharovoi Molnii' ('The Nature of Ball Lightning', *sharovoi* being 'ball' and *molnii* being 'lightning') in *Doklady Akademii Nauk SSSR*

- [*Proceedings of the USSR Academy of Science*], Vol. 101, No. 2, 1955, pp. 245–8. An English translation of this article was published in 1961, in Donald J. Ritchie (ed.), *Ball Lightning: A Collection of Soviet Research in English Translation*, Consultants Bureau, New York, 1961, pp. 11–15.
12. He believes radiation that is reflected off the surface of the Earth causes interference patterns as a result of which ‘standing waves are set up, and at a distance equal to  $\lambda$ , the wavelength, multiplied by 0.25, 0.75, 1.25, 1.75, etc., there will be antinodes fixed in space at which the intensity of the electric field is doubled as compared with that of the incident wave. Because of the increased intensity in the neighbourhood of these surfaces, conditions will be suitable both for the formation of an initial [electric] discharge as well as for the further development and maintenance of the ionization in the cloud in which the ball lightning is formed.’ (I should explain that the Greek letter *lambda* above is the standard symbol used in physics for ‘wavelength’.)
  13. Eugene Paul Wigner, *Symmetries and Reflections: Scientific Essays*, Indiana University Press, USA, 1967, pp. 82–90.
  14. Harry Jones, *The Theory of Brillouin Zones and Electronic States in Crystals*, second revised edition, North-Holland American Elsevier, Amsterdam, 1975.
  15. D. Møller-Hillebrand, ‘Ball Lightning’, in Samuel C. Coroniti (ed.), *Problems of Atmospheric and Space Electricity: Proceedings of the Third International Conference on Atmospheric and Space Electricity*, 1963, Elsevier, Amsterdam, 1965, pp. 457–9, the photo is Figure 2 on p. 459.

## Chapter 6: When Heaven Was Young

1. *Pistis Sophia*, edited by Carl Schmidt, translation and notes by Violet Macdermot, The Coptic Gnostic Library, Vol. IX, Brill, Leiden, 1978, pp. 184–7. (The textual reference is Book Two, Chapters 83 and 84.) There is an earlier translation of this work by G. R. S. Mead, which is also very good. The Brill volume is 806 pages, because the *Pistis Sophia* is immensely long.
2. This is related in *The Apocryphon of John*, for which see below, footnote 11.
3. In one translation known as the Darby Bible Translation, the bush is described as a thorn-bush. Commentators point out that the Hebrew word for the bush is *seneh*, which is the name of a thorny bush, a species of acacia, common in Sinai. But the original Hebrew language version is lost, and *seneh* is a translation into Hebrew from the Greek Septuagint where the Hebrew translator has used creative licence. (*Seneh* is thus a product of reverse-engineering by a Hebrew translator who has added it, thinking that he was thus being helpful to readers.) In the Septuagint, which is the oldest text of Exodus in existence, the Greek word for the bush is *batos*. That means a bramble, in other words a wild raspberry or blackberry bush, not any other bush or plant such as buckthorn or acacia.

Theophrastus, the colleague and successor of Aristotle, was the founder of scientific botany, and the authoritative expert on Greek botanical terminology of the fourth century BC, taking precedence even over the herbalist Dioscorides, who lived AD 40–90 and was three centuries later. In his *Peri Phytōn Historias*, III, xviii, 4, Theophrastus explains that *batos* is a broad term for bramble-like plants.

He says: ‘Of the bramble (*batos*) again there are several kinds, showing very great variation, one is erect and tall, another runs along the ground and from the first bends downwards, and when it touches the earth, it roots again, this some call “the ground bramble.” The “dog’s bramble” (the wild rose that we today call the dog rose, thus continuing the ancient Greek name associated for unknown reasons with dogs) has a reddish fruit like that of the pomegranate, it is intermediate between a shrub and a tree, but the leaf is spinous.’ (Theophrastus, *Enquiry into*

*Plants*, translated by Arthur F Hort, Loeb Classical Library, Harvard University Press, Vol. I, 1916, pp. 270–1.)

Obviously the Burning Bush could not have been either the creeping bramble or the dog rose, and can only be the one that is 'erect and tall'. As for the masculine noun *batos* meaning a blackberry bush, it is worth noting that the neuter noun *baton* specifically means 'a blackberry'. The other word for a prickly shrub, often applied to buckthorn for instance, was *rhamnos*, and there was also the word *phylukē*, which referred to an evergreen prickly shrub. It seems therefore that if the Septuagint had intended a prickly shrub other than the bramble, such as buckthorn, the word *rhamnos* would have been used instead of *batos*. And if acacia had been meant, its Greek name *akantha* would have been used. Hence the translation of *batos* as *seneh* was evidently incorrect.

It seems that in the earliest surviving text we are stuck with the unlikely and somewhat inglorious bramble, which sprawls at the sides of most English roads and hedges and from which country children pick berries to make jam in the autumn. Somehow, that is extraordinarily mundane for a divine epiphany. It is hardly surprising, therefore, that we are never told this by theologians, as the idea that Moses went up onto a mountain in order to converse with a burning blackberry bush is unimpressive.

4. It is necessary to say more about the mysterious 'Angel of the Lord', since this anomaly in both the Jewish and Christian religious traditions is usually ignored. Who and what was the 'Angel of the Lord'? This divine entity of the burning bush, who was not 'the Lord' but was someone or something else closely associated with 'the Lord', was known in very ancient Judaism (which testifies to the antiquity of the Moses account, I might add), but had been either forgotten or banished as heretical by the time of the sect of Judaism known as the Sadducees, who were the 'Temple Jews' of the Jerusalem Temple against whom Jesus struggled so energetically.

The Sadducees were a very vicious and murderous ruling theocratic sect. Biblical scholars have discovered that during the lifetime of Jesus, the Sadducees arrested and executed more than 6000 Jewish rabbis of the Pharisee sect, solely because they were rivals for control. The Sadducees were therefore a violent, bloodthirsty mafia using religion as their pretext for control over society. What the Sadducees did to the more mystical Jews such as the Gnostics was probably even worse than the massacres of the Pharisee rabbis, though the numbers of Gnostics within reach of Jerusalem was much smaller. Some of them, the Essenes, had fled to live in caves beside the Dead Sea, in order to avoid being murdered by the Sadducees.

The seizure and execution of Jesus was part of a wider and uniform purge by the Sadducees of all the Jewish rabbis or religious leaders who in any way challenged the Sadducees' monopoly of power. I could elaborate on this subject and explain the real significance of the 'overturning of the tables of the moneychangers in the Temple' by Jesus, but this is not the place to do so, interesting as the subject is. North of Jerusalem lay the region of the Samaritans, who were a branch of the Jewish people who had escaped the control of the Jerusalem Temple mafia. They preserved some of the more ancient Jewish knowledge and traditions that the Sadducees had thrown overboard. Among these was the tradition and explanation of 'the Angel of the Lord'.

The Dutch Biblical scholar Jarl Fossum was the first academic who explored in depth this fascinating information, which he articulated in his PhD thesis of 1981 (supervised by the famous Professor Gilles Quispel, one of the world's leading Biblical scholars) and in the same year in an article in a scholarly anthology, Fossum, Jarl, 'Samaritan Demurgical Traditions and the Alleged Dove Cult of the Samaritans', in Roelof van den Broek and Maarten Jozef Vermaseren (eds.), *Studies in Gnosticism and Hellenistic Religions Presented to Gilles Quispel on the Occasion of His 65th Birthday*, Brill, Leiden, 1981, pp. 143–60.



This was later followed by his book, *The Name of God and the Angel of the Lord: Samaritan and Jewish Concepts of Intermediation and the Origin of Gnosticism*, J.C.B. Mohr, Tübingen, 1985, which was based on his thesis. The ancient Jewish conception preserved by the Samaritans was that 'the Angel of the Lord' was the divine entity who actually created the bodies of men, while 'the Lord' infused spirits into those bodies. As Fossum puts it: 'the creation of the body of Adam from the earth is ascribed to the Angel of the Lord, while the infusion of the spirit into this corpus is a work assigned to God'.

The Samaritans claimed to know the actual name of the Angel of the Lord, which was Kebala, which means 'the Secret'. They maintained that it was the Angel Kebala who really resided in the sanctuary of the Temple, not God himself (who remained in Heaven), and that Kebala was the mediator between God and humankind. Moreover, his glowing or burning nature is suggested by the Samaritans calling Kebala 'the Glory who fills the Tabernacle', and they say that he also manifested himself as Glory at the door of the Tent of Meeting in the passage of Exodus that commences at 21, 42 (ibid., pp. 143, 157-9). The Samaritans claimed that Kebala abided at Bethel, which means 'House of God', on top of Mount Gerizim.

I cannot go further into this interesting ancient variation of Judaism, which has been lost now for nearly 2000 years, but I wanted to offer this information to help explain the identity of 'the Angel of the Lord' for justly puzzled readers. A few years before Fossum's important researches into the Samaritans, Alan F. Segal had partially addressed the problem in his fascinating book *Two Powers in Heaven*, in which he speaks of numerous early Jewish sects (when Judaism was not yet forcibly unified by a central theological authority at the central Jerusalem temple), who insisted that God had a divine deputy (a lesser god) who did all his work for him regarding the Earth and humans.

Probably the most frequently occurring name for this entity is Metatron. Segal also quotes numerous rabbinical sources regarding further details of the myth or legend of the ascent of Moses up the mountain. Some of these contain further plasmic details. For instance, there is a strong Jewish tradition that Moses was taken up from the mountain to heaven in a 'cloud', and a text known as the *Pesikta Rabbati* (20, 4), says:

'Then a troop of angels of destruction, strong and mighty, who are set round about the throne of glory, met him. When Moses reached them, they sought to burn him with the breath of their mouths. What did the Holy One, blessed be He, do? He spread something of his own splendour about Moses. . . (this) prove(s), according to Rabbi Nahum, that the Almighty spread about Moses something of the splendour of the presence of God, which is His cloud.'

Alan F. Segal, *Two Powers in Heaven: Early Rabbinic Reports about Christianity and Gnosticism*, Brill, Leiden, 1977, p. 145.

One is tempted to wonder if the ancient Jews somehow realized that the Kordylewski Clouds existed, perhaps as a result of telepathic shamanic journeys. One could even construe these ancient Jewish ideas as suggesting that the Kordylewski Clouds are indeed Metatron. The subject of Metatron, who was traditionally the highest of the angels in both mystical Judaism and Islam, is especially intriguing considering that there was an ancient Jewish tradition that there were two Metatrons. One was called Prince of the Countenance and the other was called Yahoel. And one ancient text says that 'the Ancient of Days' mentioned in the Biblical Book of Daniel is really Metatron.

Metatron is also mentioned in the book 3 Enoch, and Enoch was said to be transformed into (or absorbed into) Metatron when he was raised in his ball of fire to the heavens. In that book, Metatron is also said to have seventy names, of which the first and chief was Yahoel (sometimes



abbreviated as Yoi) The Muslim name of Metatron is Mitatrush, which means 'the angel of the veil' In the mystical Jewish book *The Apocalypse of Abraham*, Yahoel is described as 'the spiritual teacher of the Patriarch' (Abraham), who taught Abraham the whole of the Torah

The great scholar Gershom Scholem concludes that Metatron, whose original name was Yahoel, was 'the highest of all created beings' The name Yahoel was a 'mystic name' according to Scholem and thus had no etymological meaning The suffix el is, I am told, an honorary termination for the name of any angel, and means 'lord', used in the polite sense only, not in the literal sense of 'the Lord' As for Yaho (the part of the name that precedes the honorific el), Scholem points out that it is an abbreviation of the name YHWH, i.e., Yahweh, whom we call in English Jehovah But he stresses that the intention was not that Yahoel was meant to be Jehovah, but that his high status was meant to be signalled by the fact that his mystic name contained the name of the supreme God

Scholem says that this explains the puzzling passage in the Book of Exodus (XXIII, 20 ff) 'Beware of him for my name is in him' And in *The Apocalypse of Abraham*, Yahoel is quoted as saying to Abraham 'I am called Yahoel a power in virtue of the ineffable name that is dwelling in me' And Jewish Gnostic literature makes explicit that Yahoel was not Yahweh, but was 'the lesser Yaho', (Gershom Scholem, *Major Trends in Jewish Mysticism*, Schocken Publishing House, Jerusalem, 1941, pp. 66-9) That is essentially the same as saying that he was the Angel of the Lord, who as we know appeared as a glowing ball, so that we may assume that Yahoel was one, too

This subject could be discussed at very great length indeed, to the great discomfort of 'normative rabbinical Judaism', as Gershom Scholem (whom I was fortunate enough to know) called the dominant Judaism that exists in our contemporary world The earliest name for God in Judaism appears to have been Elohim, and there is no escaping the embarrassing fact that that name is plural In other words, there is little indication that the earliest Judaism was monotheistic, and 'the Angel of the Lord' was apparently left over from the earliest Judaism and only awkwardly accommodated in orthodoxy.

- 5 Another translation of these passages may be found in the book *I Enoch A New Translation*, by George W E Nickelsburg and James C VanderKam, Fortress Press, Minneapolis, Minnesota, USA, 2004, pp. 34-6.
- 6 It was G R S Mead who spotted and translated this fragment of a lost work by Damascius, which he found in the tenth-century Byzantine encyclopaedic lexicon named the *Suda*, which until contemporary times was mistakenly called 'Suidas' (Refs. p. 194 of Bekker's edition of 1854, or I. 850 f. of Bernhardy's edition of 1853) See G R S Mead, *The Subtle Body*, J M Watkins, London, 1919, p. 80 and note The fragment comes from a lost work entitled *Life of Isidorus* Isidorus was the husband of Hypatia and friend of Proclus and Marinus What a pity that work is lost!

Mead's translation of this passage by Damascius first appeared in the quarterly journal he edited named *The Quest*, Vol. I, No. 4, July 1910, pp. 708-9, where he inserted some of the Greek words of the text as part of an extended discussion of the terminology used To discuss the many points arising from all of this would unfortunately be out of place here

- 7 Translation by G R S Mead, see Mead, op. cit., p. 88 and note A more recent translation has also been published since Mead's time, see Philoponus, *On Aristotle's 'On the Soul'*, I, 1, 18-27-33, translated by Philip J van der Eijk, *Philoponus on Aristotle's 'On the Soul' I 1-2*, Cornell University Press, Ithaca, New York, USA, 2005, p. 34.

His translation reads 'there is yet another body eternally attached to it [the pneumatic body], which is celestial and therefore eternal, which is called luminous or astral For as the soul belongs to the cosmic entities, it must have a share assigned to it which it manages, being part of

the cosmos, and if it is always in motion and always has to be active, it must have a body eternally attached to it which it will keep alive always, this is why they say the soul always has the luminous body, since this is eternal.' On pp. 123–4, van der Eijk's footnote 183 gives a lengthy historical survey of this concept of a 'radiant' or 'luminous' body, citing Plotinus, Porphyry, Iamblichus, Synesius, Hierocles, Proclus, and numerous modern scholars who have discussed the subject. We do not have space to survey this fascinating subject here.

8. *The Apocalypse of Adam* (the fifth and final tractate from Nag Hammadi Codex Five), edited and translated by George W. MacRae, in *The Coptic Gnostic Library: Nag Hammadi Codices V 2, 5 and V with Papyrus Berolinensis 8502, 1 and 4*, ed. by Douglas M. Parrott, Brill, Leiden, 1979, pp. 151–95. See also Charles W. Hedrick, *The Apocalypse of Adam: A Literary and Source Analysis*, Wipf & Stock Publishers, Eugene, Oregon, USA, 2005, for further background and analysis of this tractate.
9. *Marsanes* (from Nag Hammadi Codex 10), introduced, edited and translated by Birger A. Pearson, in *The Coptic Gnostic Library: Nag Hammadi Codices IX and X*, ed. by Birger A. Pearson, Brill, Leiden, 1981, pp. 229–347.
10. *The Paraphrase of Shem* (Tractate One of Nag Hammadi Codex Seven), introduced and translated with commentary by Michel Roberge, Brill, Leiden, 2010.
11. *The Apocryphon of John* (from four sources: Nag Hammadi Codices II, 1, III, 1, and IV, 1, as well as Papyrus Berolinensis 8502, 2), edited and translated by Michael Waldstein and Frederik Wisse, Brill, Leiden, 1995. The Noah passage may be found preserved in three slightly varying versions on pp. 162–5, all three of which specifically mention the 'luminous cloud'.
12. He also postulated the existence of something he called *pneuma*, which existed and intermingled with things here on earth and was, for instance, present in animal and human sperm. These ideas are expressed in Aristotle's lengthy zoological works, which few people today ever read. I had to read them all thoroughly because I was asked to do a general review of them for *Nature* some years ago (Robert Temple, 'The Roots of Nature', in *Nature*, Vol. 359, No. 6395, 8 October 1992, pp. 489–90.) This article may be downloaded from my researchgate.net entry. In it, I reconstructed the outline of his 'lost' zoological work, *Close Investigations of Things According to Kind* and I also surveyed all of the botanical works of Aristotle's successor and friend, Theophrastus.

Before writing that article, I read closely every word in translation of Aristotle's surviving zoological writings and Theophrastus's botanical writings, all the footnotes, and checked lots of the original text with particular attention to the vocabulary, as I went along, which was an immense task, frankly, but well worth it. I do not believe that many classical scholars have ever done that. As for reading them all the way through in Greek, I have known a few scholars (such as Alan Gotthelf) who did that for the zoological works, but they did not extend their efforts to the botanical works as well.

*Pneuma* and *aithēr* were related, but *aithēr* was the pure form, which was restricted to the higher levels of reality, and *pneuma* was that lower and distinctly impure form that intermingled with and helped to animate ordinary matter. Aristotle's concept of *pneuma* had a big influence on early Church Fathers and Christian theology, helping to inspire the Christian concept of the *logos* as the 'word of God' and Jesus as the *aethēric* being who became *pneumatic* to save us by bringing some of the *aithēr* down into corrupt matter to infuse it with light. These concepts inspired the Gospel of John in the Bible, and permeated even more thoroughly the ancient Gnostic texts. But these subjects are all another story that we cannot discuss further here.

13. Aristotle also stated that he believed there were exceptions to the parallel postulate in geometry, thus anticipating modern relativity theory. And he discovered the Eustachian tubes in the human ear approximately 1900 years before Bartolomeo Eustachio (1500–1574), to whom the discovery is normally attributed, and after whom they are named. For an account of this, see Robert Temple,

- 'Aristotle as Anatomist and Dissector' The Marvels of Nature', in *Helix Amigen's Magazine of Biotechnology*, Vol. II, Issue 2, Bagamort International BV, Almere, Netherlands, 1993, pp. 49–55. The text is Aristotle, *Historia Animalium*, Book One, 502a17–502b27. This article may be downloaded from my Researchgate entry or from my personal website. But enough of Aristotle, that is, if one can have enough of Aristotle.
14. The Chinese texts for these passages, with translations and comments, may be found in Herbert A. Giles, 'The Remains of Lao Tzu', in *The China Review or Notes and Queries of the Far East*, China Mail, Hong Kong, Vol. XIV, issue for March and April, 1886, p. 244.
  15. Olivia Temple and Robert Temple, *The Sphinx Mystery*, Inner Traditions, Rochester, Vermont, USA, 2009, p. 393.
  16. John Coleman Darnell, *The Enigmatic Netherworld Books of the Solar-Osirian Unity*, Academic Press Fribourg, Switzerland, 2004, p. 365, footnote 389.

## Chapter 7: Kristian Birkeland's Miraculous Discovery

1. Harald Falck-Ytter, *Aurora: The Northern Lights in Mythology, History and Science*, Bell Pond Books, Hudson, New York, USA, 1999, p. 49. This is the English translation of *Das Polarlicht*, Stuttgart, 1983.
2. Aristotle, *Metēōrologikōn* (*Meteorology*, but often referred to in Latin as the *Meteorologica*), Book One, Chapters 4 and 5, 341b1–342b24. See Aristotle, *Meteorologica*, trans. by H. D. P. Lee, Loeb Classical Library, Harvard University Press, 1952, pp. 28–39.
3. Falck-Ytter, op. cit., p. 45.
4. Aristotle, op. cit., Chapters 3 and 4, 340b25–7 and 341b1–24, pp. 19–23, 29–31 ('We maintain that the celestial region as far down as the moon is occupied by a body which is different from air and from fire – what we are accustomed to call fire, though it is not really fire. We must suppose therefore that the reason why clouds do not form in the upper region is that it contains not air only but rather a sort of fire – immediately beneath the circular celestial motion comes a warm and dry substance which we call fire. We must think of the substance we have just called fire as extending round the outside of the terrestrial sphere like a kind of inflammable material...')
5. Heraclitus, *Homeric Problems*, ed. and translated by Donald A. Russell and David Konstan, Brill, Leiden, 2005, Book 23, p. 45.
6. Plutarch, 'Life of Lysander', Chapter 12, in *Plutarch's Lives* (in four vols.), trans. by Aubrey Stewart and George Long, Bohn's Classical Library, George Bell & Sons, London, 1895, Vol. 2, pp. 294–5.
7. Lucius Annaeus Seneca, *Questiones Naturales* (*Natural Questions*), trans. as *Physical Science in the Time of Nero: Being a Translation of the Questiones Naturales of Seneca*, by John Clarke, with Notes by Sir Archibald Geikie, Macmillan and Co., London 1910, pp. 37–41, more recently, Seneca, *Naturales Questiones*, 2 vols., trans. by Thomas H. Corcoran, Loeb Classical Library, Harvard University Press, 1971–2, Vol. I, pp. 73–83.
8. Pliny, *Natural History*, Book Two, Chapter 26 or 27 depending on the edition. In Bohn's Classical Library, trans. by John Bostock and H. T. Riley, Henry G. Bohn, London, 1855, Vol. 1, pp. 60–1, it is Chapter 27. In the Loeb Classical Library, trans. by H. Rackham, Harvard University Press, Vol. 1, p. 241, it is Chapter 26, which becomes 27 in the middle of a sentence. Puzzled by this, I checked the earliest translation done in Elizabethan times by Philemon Holland, of which I am fortunate to own copies of both the first edition of 1601 and the second edition, which appeared in 1635, and there it is Chapter 27, and the passage is found on p. 17.  
Holland's translation reads 'There appeareth in the Sky also a resemblance of bloud, and (than which nothing is more dread and feared of men) a fiery impression, falling from out of heaven to

earth, like as it hapned in the 3<sup>rd</sup> year of the 107 Olympiad, at what time King Philip made all Greece to shake with fire and sword ' The Bohn's translation reads 'There is a flame of a bloody appearance (and nothing is more dreaded by mortals) which falls down upon the earth, such as was seen in the third year of the 103<sup>rd</sup> Olympiad, when King Philip was disturbing Greece ' The Loeb translation says 'There also occurs a yawning of the actual sky, called *chasma*, and also something that looks like blood, and a fire that falls from it to the earth the most alarming possible cause of terror to mankind, as happened in the third year of the 107<sup>th</sup> Olympiad, when King Philip was throwing Greece into disturbance.'

- 9 Falck-Ytter, op. cit., pp. 54–5.
- 10 Jean-Jacques d'Ortous de Mairan, *Traite Physique et Historique de l'Aurore Boreale (Physical and Historical Treatise concerning the Aurora Borealis)*, Pierre Mortier, Amsterdam, 1735, 393 pp., with 17 folding plates. On the title page it is stated that the book is composed of a 'suite' of papers delivered to the Académie Royale des Sciences (in Paris) in 1731. I have an original copy of this book.
- 11 I have a copy also of this German edition, which appears in Wolf Balthazar Adolph von Steinwehr (1704–1771), translator and editor (with some commentary), Vol. 9 of *Der Königliche Academie der Wissenschaften in Paris Physiche Abhandlungen welcher die Jahre 1731–1732 in sich halt*, Breslau, 1753. (Please note that Wikipedia is incorrect in listing the year 1760 as publication date for this volume, though it may have been reprinted then perhaps.) The de Mairan material extends from p. 248 to p. 564. De Mairan is called von Mairan in this volume.  
The Aurora Borealis in German is called *die Nordlichtern* (the Northern Lights). Only 9 of the 17 plates that appear in the 1735 French volume are found in this German edition. This series of volumes in German is essentially a translation of the Proceedings of the Royal Academy of Sciences in Paris. It should be noted that the 1731 publication by the Academy in Paris was used for the translation, and not the 1735 book, which may have been expanded and provided with additional illustrations. I have not compared the 1731 publications with the 1735 volume, so cannot state anything authoritatively about variations in the texts.
- 12 Knud Leem, *Beskrivelse over Finmarkens Lapper (An Account of the Lapps of Finmarken)*, Copenhagen, 1767. A reproduction of Leem's engraving was published by Lemström, Vol. 1, p. 238, and is reproduced from that on this book's website. For Lemström, see footnote 17 below.
- 13 Sir Humphry Davy, 'Of Electrical Attraction and Repulsion, and Their Relations to Chemical Changes', in *Elements of Chemical Philosophy*, London, 1812.
- 14 Baron Karl von Reichenbach, *Researches on Magnetism. Electricity. Heat. Light. Crystallization, and Chemical Attraction in Their Relation to the Vital Force*, translated and edited by William Gregory, Parts I and II, London, 1850, p. 5.
- 15 Ibid., pp. 445–51.
- 16 Arthur-August De La Rive, 'Nouvelles Recherches sur les Aurores Boréales et Australes et Description d'un Appareil', *Extrait des Memoires de la Société de Physique et d'Histoire Naturelle de Genève*, Vol. 16, 2nd Part, Geneva, 1862.
- 17 Karl Selim Lemström, 'On the Periodic Variations in Some Meteorological Phenomena, Their Connection with the Changes of the Solar Surface and Their Probable Influence on the Vegetation', in *Finsk Tidkrift*, 1878. This article is in Swedish.
- 18 Sophus Tromholt, *Under the Rays of the Aurora Borealis in the Land of the Lapps and Kvaens*, edited by Carl Siewers, 2 vols., Houghton Mifflin, Cambridge, Massachusetts, USA, 1885. The section entitled 'On the Aurora Borealis' is found in Vol. 1, pp. 192–288, with numerous illustrations.
- 19 Adam F.W. Paulsen, *Résumé des Travaux de l'Expédition Internationale Danoise Faits à Godthaab (Groenland Occidental) 1<sup>er</sup> Aout 1882–31 Aout 1883* [1 August 1882–31 August 1883], Danish Meteorological Institute, Copenhagen, 1884.

- 20 Nils Adolf-Erik Nordenskiöld, 'Sur les Aurores Boréales Observées Pendant l'Hivernage de la Vêga au Détroit de Behring (1878- 9)', in *Annales de Chimie et de Physique (Annals of Chemistry and Physics)*, Sixth Series, Vol. 1, Paris, January 1884, pp 5-72. His earlier publication in Swedish was 'Om Norrskencen under Vegas Öfvervintring vid Berings Sund (1878- 9) af A.-E. Nordenskiöld' extracted from *Vega-expeditionens Vetenskapliga Iakttagelser*, pp 403-53 of Vol. 1, Stockholm, 1882. Nordenskiöld published a mammoth account of the Vega Expedition in 5 volumes, as well as a popular summary in 2 volumes, but these extracts related to the Aurora Borealis, as they appeared first in the original Swedish and then in the French translation.
- 21 Kristian Birkeland, in *Archives des Sciences Physiques et Naturelles (Archives of the Physical and Natural Sciences)*, Geneva, June 1896 (in French). Perhaps Birkeland chose this journal because in its earlier incarnation it had published de la Rive's account of the aurorae in 1862, thirty-four years before, see footnote 16 above.
- 22 Kristian Birkeland, *Expedition Norvegienne 1899- 1900 pour l' Étude des Aurores Boreales Resultats des Recherches Magnetiques* [*sic* some acute accents omitted from title as printed], Jacob Dybwad, Christiania [now called Oslo], Norway, 1901. See p. 39, where in a footnote Birkeland refers to the article published by himself in the *Archives des Sciences Physiques et Naturelles* (see footnote 16 above). I have not found or consulted the original article and do not have its title and pagination.
23. Alv Egeland and William J. Burke, *Kristian Birkeland: The First Space Scientist*, Astrophysics and Space Science Library 325, Springer Verlag, 2005.
24. Lucy Jago, *The Northern Lights*, Penguin Books, London, 2001.
25. Kristian Birkeland, *The Norwegian Aurora Polaris Expedition 1902- 1903*, 2 vols., Christiania [now Oslo], Vol. 1, 1908, and Vol. 2, 1913.
26. Alexander Piel, *Plasma Physics: An Introduction to Laboratory, Space, and Fusion Plasmas*, Springer Verlag, Heidelberg and Dordrecht, 2010, p. 7.
27. Kristian Birkeland, *Norwegian Aurora Polaris Expedition 1902- 1903*, 2 vols., Christiania [now Oslo], Vol. 1 and Vol. 2, 1908, 1913.

## Chapter 8: The Cosmic Web

1. I should point out that all power transmission lines on Earth are double, either in the form of a 'two-wire line' or a single wire inside a tube, which is known as a coaxial cable. (Transmission lines can of course be multiple, but they must at the very least be double.)
2. John P. Cullerne and Anton Machacek, *The Language of Physics: A Foundation for University Study*, Oxford University Press, 2008, p. 51.
3. This reminds me of the Berry Phase in physics, named after Michael Berry, a professor at Bristol University. He showed that if you mathematically transport a vector (the technical name for a line in a diagram showing the direction of a certain force, and which can actually be drawn with an arrow showing that direction) along the surface of a sphere from point A to point B, by the time it gets there it is not straight any more but is at a slight angle, because its path has curved due to moving along the spherical surface. (Berry's student John Hannay demonstrated that this is true in classical physics as well as in quantum physics, and the angle is named after him as the Hannay Angle.) I mention this because if we consider the spiralling aspect of the electric field, introducing as it does a curved path rather than a straight one, perhaps the introduction of that curvature causes the small deflected angle of the Hall Effect to appear, and the angle of the Hall Effect is therefore related to the Hannay Angle because of the curvature.
4. Anthony L. Peratt, *Physics of the Plasma Universe*, 2nd edition, 2015, p. 373.

## Chapter 9: The Cold Sun

- 1 Lang, Kenneth R., *The Cambridge Encyclopaedia of the Sun*, Cambridge University Press, 2001, p. 111.
- 2 Arthur J Hundhausen, 'Plasma Flow from the Sun', in Oran R. White (ed.), *The Solar Output and Its Variation*, Colorado Associated University Press, Boulder, Colorado, USA, 1977, pp. 36–9

## Chapter 10: Invisible Earth

- 1 Thomas Gold, *The Deep Hot Biosphere*, Copernicus, Springer Verlag, New York, 1999. He did not remain connected with plasma research, however, as he had other interests such as cosmology and, towards the end of his life, deep carbon stores beneath the surface of the Earth. Tommy was also a founder, with Fred Hoyle and Hermann Bondi, of the steady state theory of the Universe, which neither he nor Fred (whom I also knew well) ever abandoned, though of course they held to it in a modified form to take account of the many objections made against it by cosmologists determined to believe in what Fred had derisively named 'the Big Bang', a name that has stuck and unfortunately is still taken seriously, along with the ridiculous theory to which it is attached.  
In 2017, I published a paper proposing an alternative explanation of what is known as 'the cosmic microwave background radiation temperature', the primary basis for the Big Bang Theory. Robert Temple, 'A New Explanation for the Cosmic Microwave Background Radiation Temperature', in *Journal of Cosmology*, Vol. 26, No. 11, 2017, pp. 14790–803.

## Chapter 11: Radiant Matter, Plasma and Plasmoids

- 1 Winston Harper Bostick, 'Experimental Study of Ionized Matter Projected across a Magnetic Field', *Physical Review*, Vol. 104, No. 2, 15 October 1956, pp. 292–9, plus seven pages of captioned plates.
- 2 Robert Temple, 'Is Particle Mass a Function of Degrees of Freedom?', in *Journal of Cosmology*, Vol. 26, No. 3, January 2016, pp. 13995–14090; see p. 66 of the paper.
- 3 F.G. Harris, R.B. Theus, and Winston Harper Bostick, 'Experimental Investigations of the Motion of Plasma Projected from a Button Source across Magnetic Field', *Physical Review*, Vol. 105, No. 1, 1 January 1957, pp. 46–50.
- 4 Winston Harper Bostick and Lyman Spitzer, *Plasma Physics: Selected Reprints*, American Association of Physics Teachers, 1963.
- 5 Winston Harper Bostick, 'Plasmoids', in *Scientific American*, Vol. 197, No. 4, October 1957, pp. 87–94.
- 6 Winston Harper Bostick, 'Experimental Study of Plasmoids', in Bo Lehnert (ed.), *Electromagnetic Phenomena in Cosmical Physics*, Proceedings of the International Astronomical Union Symposium No. 6, held in Stockholm, August 1956, Cambridge University Press, 1958, pp. 86–98 (includes one and a half pages of discussion at the end, including further elucidations by Bostick).

## Chapter 12: Plasma Comes Alive

- 1 Kaushik Roy and Prasanta Chatterjee, *Nonlinear Structures in Dusty Plasma*, Lambert Academic Publishing, Saarbrücken, Germany, 2012, p. 2.

2. I have discussed the Kelvin Scale at some length in my scientific paper of 2017 about the cosmic background radiation Robert Temple, 'A New Explanation for the Cosmic Microwave Background Radiation Temperature', in *Journal of Cosmology*, Vol 26, No 11, 2017, pp 14790–803
3. Mazuo Minami, Chikara Kojima, Takeo Ohira, and Osamu Ishihara, 'Microwave Measurement of Decaying Plasma in Liquid Helium', Appendix One to Osamu Ishihara, 'Final Report on Study of Cryogenic Plasma in Superfluid Liquid Helium', submitted to AOARD 23 August 2005, declassified by the US Department of Defense. The Appendix was released for publication in *Transactions on Plasma Science of the IEEE*, August 2005 (8 pp )
4. Ibid., p 4
5. Norman R. Bergrun, *Ringmakers of Saturn*, Pentland Press, Edinburgh, 1986 The late Norman Bergrun was a scientist who had an entirely different explanation for the 'spokes' In 1986, he published his book *Ringmakers of Saturn*, which suggested that not only the spokes of Ring B but the whole of Ring A of Saturn were being artificially created by mysterious cylindrical craft of extraterrestrial origin, possibly manned by intelligent robots Both in his book and in many later talks, some of which can readily be found on the internet, Bergrun has shown photographs of strange cylinders of enormous size orbiting Saturn, which are spewing out what he calls 'streamers' He claims that these are plasma streamers, although he does not appear to have any idea as to why this is being done

His idea of strange cylindrical craft emitting streamers of plasma arose from a chance personal observation that he made of such a craft in the atmosphere off the coast of California in September 1971, which was also viewed by his wife from a separate location By triangulating their observations, he and his wife were able to place the 'UFO' at a distance of sixty miles off the coast of Monterey Bay Bergrun calls these craft 'EMVs', for electromagnetic vehicles Although this all sounds very fanciful, I was told in 2015 by a friend who knows top scientists and officials at DARPA, the Defence Advanced Research Projects Agency of the US Government (by far the most advanced 'weird science' organization or agency in America, which developed stealth aircraft, among other things), that the DARPA people not only know of but accept and worry about the intrusive cylindrical craft, which they accept are 'not of this Earth'

They may come from 'another world' 'another dimension', 'the future', or whatever you like, but they do not come from any human civilization of the present day Some of the cylindrical craft can be of such enormous size that no contemporary civilization on Earth would be capable of constructing anything so huge, even if it were sitting on the ground. It is apparently known and accepted by the scientists at DARPA that these craft have intimate connections with a highly advanced plasma science that is far beyond our present understanding or capacities Apparently they also believe that they are not manned by living beings, but by hyper-intelligent robots that come from 'somewhere else', but no one knows where.

No living entities could accomplish these feats, as the gigantic tasks involved could only be undertaken by robots over extremely long periods of time, far exceeding any conceivable human or other organic lifespans Just in case anybody thinks that constructing spaceships by robots is far-fetched, I can point out that we humans are already doing it The London *Sunday Times* published on 15 August 2021 (page 9 in the 'Money' section) an article entitled 'Backing the spaceships being built by robots', which reported that the American company Relativity Space is building 'its "Stargate" factory (which) will build rockets through 3D printing' and assemble by robots the more than 100,000 parts that must go into each spaceship.

I mention all of this about Bergrun's ideas in passing without personal comment, because it is not the subject of this book. However, it appears that the urgent impetus behind much of the advanced plasma research going on at the moment comes from DARPA, who are desperate to try to understand the intruders (Another reason is that stealth aircraft can be much improved if Bose-



Einstein condensate technology can be mastered for the exterior skins of the planes. That relies upon extraordinary discoveries which have been made since 2010. Although this relates to our subject, it has been necessary to remove my account of it from the book for reasons of space. The technology is named after Satyendra Nath Bose (an Indian) and Albert Einstein. Information about its basic principles can be found on the web.)

6. Douglas C B Whittet, *Dust in the Galactic Environment*, Institute of Physics Publishing, Bristol, Philadelphia and New York, 1992, pp. 1–2
7. Vadim Nikolaevich Tsytovich, Gregor Eugen Morfill, Vladimir E [Yevgenyevich] Fortov, N G Husein-Zade, Boris Aleksandrovich Klumov, and Sergey Vladimirovich Vladimirov, 'From Plasma Crystals and Helical Structures towards Inorganic Living Matter', in *New Journal of Physics*, Vol. 9, 2007, pp. 263 ff.
8. Dietmar Block and André Melzer, 'Imaging Diagnosis in Dusty Plasmas', in Michael Bonitz, Norman Horing, and Patrick Ludwig (eds.), *Introduction to Complex Plasmas*, Springer, Berlin, 2010, p. 136.
9. Fred Hoyle, *The Black Cloud*, Heinemann, London, 1957. This novel concerns a large black cloud in outer space, which possesses a high degree of intelligence. This science fiction novel caused a considerable sensation with the public when it was published, and established Fred Hoyle as one of the world's major science fiction authors. Such was the popular clamour for more such intelligent science fiction from Hoyle that he was approached by the BBC and, with the BBC producer John Elliot, wrote a famous TV drama series called *A for Andromeda*, broadcast in 1961, which was followed by *The Andromeda Breakthrough* in 1962. These caught the popular imagination, and people still talk about them all these many decades later. *A for Andromeda* was made into a feature film in 2006. *The Black Cloud* has never been filmed.

## Chapter 13: The Mysterious Case of the Dirty Gas

1. The first one I saw (unsigned) was in the *London Daily Telegraph*, 23 September 2015, and was entitled 'Why We Are All Under a Cloud (of Germs, That Is)'. On the same day, the BBC News website carried an article by James Gallagher, the BBC's Health Editor, entitled 'Everyone Has a "Microbial Cloud"'. Gallagher speculated: 'So should we all take extra showers?' But a British bacteriologist whom he consulted told him 'It wouldn't help.' Adam Altrichter, a researcher working with Meadow, told him on the phone: 'We need to understand that we're not sterile and this is something completely natural and healthy.'
2. James Meadow, Adam E. Altrichter, Ashley C Bateman, Jason Stenson, G Z Brown, Jessica L. Green, and Brendan J M. Bohannon, 'Humans Differ in Their Personal Microbial Cloud', *PeerJ*, 22 September 2015, at <https://doi.org> (the International DOI Federation, or IDF)
3. Gregor Morfill, Yuri Baturin, and Vladimir Fortov, *Plasma Research at the Limit: From the International Space Station to Applications on Earth*, Imperial College Press, London, London, 2013, pp. 231–2.
4. G M Baulc and R. McFee, 'Detection of the Magnetic Field of the Heart', in *American Heart Journal*, Vol. 66, 1963, pp. 95–6. This was followed two years later by their paper 'Theory of Magnetic Detection of the Heart's Electrical Activity', in the *Journal of Applied Physics*, Vol. 36, 1965, pp. 2066–73.
5. David B. Geselowitz, 'On the Magnetic Field Generated Outside an Inhomogeneous Volume Conductor by Internal Current Sources' in *Transactions of the IEEE Magazine*, MAG-6, 1970, pp. 346–7.
6. David B. Geselowitz, 'Model Studies of Electric and Magnetic Fields of the Heart', in *Journal of the Franklin Institute*, Vol. 296, No. 6, December 1973, pp. 379–91. He then went on to become a world expert on this subject.



- 7 Freeman Widener Cope, 'Activation Energies of Acceleration and Hypoxia Stress', Report No 5 for the Bureau of Medicine and Surgery, Naval Air Development Center, Aerospace Medical Research Department, 2 July 1970, declassified sometime subsequent to 1979
- 8 W Edward Mann, *Orgone. Reich & Eros Wilhelm Reich's Theory of Life Energy*, Simon and Schuster, New York, 1973, pp 38-9
- 9 David Talbot, *The Devil's Chessboard Allen Dulles, the CIA, and the Rise of America's Secret Government*, Harper Collins, London, 2015, p 56. So eager was Dulles to reach an accommodation with the Nazis before the Second World War ended that he initiated his own secret peace plan entitled Operation Sunrise, falsely claiming that he was a personal representative and close friend of President Roosevelt. In pursuit of his plan, he secretly negotiated a peace deal, entirely without authority, with SS General Karl Wolff, who had previously been Himmler's Chief of Staff (Himmler was so fond of Wolff that he called him 'Wolffie').  
Wolffie was also popular with Hitler, was the principal liaison between Hitler and Himmler, and was always welcome at Hitler's dinner parties. The Nazi High Command used to cite Wolffie as 'the ideal Aryan'. As an old man, Wolffie recalled 'Hitler wanted to have me nearby, because he knew that he could rely on me completely. He had known me for a long time, and rather well'. Despite being directly ordered by President Roosevelt not to negotiate with Wolffie, Dulles continued his own private American foreign policy by plotting a deal with Wolffie. Wolffie was in fact negotiating a potential deal on behalf of his boss Himmler. The plan of Dulles failed, but then, as they were such chums, Dulles went on to save Wolffie's life. The sleazy details of this treasonous tale have been discovered by Talbot. See Chapter 4, 'Sunrise', commencing on p 74
- 10 Adam Lebor, *Tower of Basel The Shadowy History of the Secret Bank That Runs the World*, Public Affairs, New York, 2013, passim. (See the Index for Allen Dulles, his equally pro-Nazi brother John Foster Dulles, and McKittrick )
- 11 Talbot, op cit., pp. 17, 617
- 12 Wilhelm Reich, *The Mass Psychology of Fascism* (translation from the manuscript of the third enlarged edition of *Die Massenpsychologie des Faschismus*), Orgone Institute Press, Inc., New York, New York, 1946, p. 31. (The first edition of this book in German was published in 1933, the second edition in 1934. The third enlarged edition existed in German only in manuscript, and fortunately it was translated by Reich and published in English before the FBI could burn it! Presumably, however, the original German manuscript of the third edition, never published in German, was destroyed or seized by the FBI, which must have delighted America's imported Nazis )
- 13 I once asked a man the first name of one of his former colleagues with whom he had jointly written a now declassified article. That is because for my bibliographies I don't like using first initials, but always like to know the first names of scientists. He denied ever knowing him, despite the fact that I have a copy of an article describing their joint work together. That shows you the fear scientists have, which is so great that they dare not admit that they have even met the people with whom they worked for years.
- 14 Freeman Widener Cope, 'Man in a Gas of Tachyon Magneto-electric Dipoles - A New Hypothesis', Parts 1, 2, 3, and 4, appearing sequentially in *Physiological Chemistry & Physics*, Vols 10 and 11 for 1978 and 1979. Part 1 is Vol 10, 1978, pp 535-40, Part 2 is Vol 10, 1978, pp 541-5, Part 3 is Vol 10, 1978, pp 547-55, Part 4 is Vol 11, 1979, pp 87-91. Cope's fifth article was separate and entitled 'Delocalized Clouds (Wavefunctions) of Polymerized Tachyon Magnetoelectric Monopoles', in the same journal, Vol 11, 1979, pp 175-9. It does not appear that he published anything further on the subject, and he died young in 1983. In the notes I shall refer to Cope, Parts 1 to 5. This quotation is from Part 1, p 535
- 15 Baron (Freiherr) Karl von Reichenbach, *Researches on Magnetism. Electricity. Heat. Light, Crystallization, and Chemical Attraction in Their Relations to The Vital Force*, Parts I and II

(including the second edition of the First Part, corrected and improved), edited and translated with a preface, notes, and appendix by William Gregory, Taylor, Walton and Maberly, London, 1850

16. Another strange cosmic force of 'vital magnetism' was proposed in 1871 by the supernatural novelist Edward Bulwer-Lytton, in his novel *The Coming Race*, though Cope does not mention this. Bulwer-Lytton appears to have taken his idea of vril from Reichenbach's odic force. Strangely enough, some of the occult Nazis seriously believed in the actual existence of vril, despite its having appeared in an admitted work of fiction. They apparently believed that Bulwer-Lytton knew of its true existence and revealed it in intentionally disguised form by proposing it within the context of a novel
17. Cope, Part 3, op. cit., p. 547.
18. Paul Dirac, 'Quantized Singularities in the Electromagnetic Field' in *Proceedings of the Royal Society of London, Series A*, Vol. CXXXIII, London, October 1931, pp. 60-72. On page 71 of this paper, Dirac says 'The object of this paper is to show that quantum mechanics does not really preclude the existence of isolated magnetic poles. On the contrary, the present formalism of quantum mechanics, when developed naturally without the imposition of arbitrary restrictions, leads inevitably to wave equations whose only physical interpretation is the motion of an electron in the field of a single [magnetic] pole.'
19. Dirac expanded and refined these ideas seventeen years later in 1948. Paul Dirac, 'The Theory of Magnetic Poles' in *The Physical Review*, Second Series, Vol. 74, No. 7, 1 October 1948, pp. 817-30. In this paper, Dirac more emphatically than ever suggested that magnetic monopoles must exist. In the various discussions of magnetic monopoles that I have encountered, Dirac's paper of 1931 tends to be cited, but I do not recall anyone citing his follow-up paper of 1948, which expands the theory considerably. (Perhaps Lochak mentioned it, although I do not recall that.)

In the 1948 paper, of which I have an original copy, Dirac says 'In 1931 I gave a primitive theory which described the action of a pole in the field of a charged particle whose motion is given, or the motion of a charged particle in the field of a pole whose motion is given. The present paper sets up a general theory of charged particles and poles in interaction through the medium of the electromagnetic field. The idea which makes this generalization possible consists in supposing each pole to be at the end of an unobservable string, which is the line along which the electromagnetic potentials are singular, and introducing dynamic coordinates and momenta to describe the motion of the strings. The whole theory then comes out by the application of standard methods. The theory developed in the present paper is essentially symmetrical between electric charges and magnetic poles.'

This brilliant paper by Dirac seems largely to have escaped notice by his fellow physicists. Dirac's idea of a 'string' is also very suggestive. My own instinct is not to think of the string as being straight, but on the contrary that it must exist either in helical form or in toroidal form (i.e., existing on one or other of the two circularities of a toroidal surface, unless linking the two). In fact, to say that a particle is a 'string' is effectively to say that it is a filament. And filaments like to spiral helically. And because they also like to spiral as double-helices, this might apply to those paired electrons known as 'Cooper Pairs', which are discussed later. These matters require deeper consideration than an aside in a footnote, however.

20. Georges Lochak, Harald Stumpf, and Peter W. Hawkes, *Advances in Imaging and Electron Physics: The Leptonic Magnetic Monopole Theory and Experiments*, Elsevier, Amsterdam, 2015.
21. Ritika Dusat, Franziska K.K. Kirschner, Jesse C. Hoke, et al., 'Magnetic Monopole Noise', in *Nature*, Vol. 571, No. 7764, 11 July 2019, pp. 234-9.
22. Ibid.

- 23 Ibid., p. 553
- 24 Herbert Charles Corben, *Classical and Quantum Theories of Spinning Particles*, Holden-Day, San Francisco, 1968
- 25 Herbert Charles Corben, 'Electromagnetic and Hadronic Properties of Tachyons', in Hugo E Hernández-Figueroa, Michel Zamboni-Rached, and Erasmo Recami (eds.), *Localized Waves*, Wiley-Interscience, John Wiley & Sons, Hoboken, New Jersey, 2008, pp. 31–41.
- 26 Cope, Part 3, op. cit., p. 553
- 27 Cope, Part 5, op. cit.
- 28 Dominic J. Clarke, Heather M. Whitney, Gregory P. Sutton, and Daniel Robert, 'Detection and Learning of Floral Electric Fields by Bumblebees', in *Science*, Vol. 340, Issue 6128, 5 April 2013, pp. 66–9. And also Gregory P. Sutton, Dominic J. Clarke, Erica L. Morley, and Daniel Robert, 'Mechanosensory Hairs in Bumblebees (*Bombus terrestris*) Detect Weak Electric Fields', in *Proceedings of the National Academy of Sciences*, Early Edition, 2016, 9 pages. Press reports on the latter appeared on 31 May 2016 in the *London Daily Telegraph*, p. 10, the *London Daily Mail*, p. 3, and the *London Times*, p. 21.

## Chapter 14: Electric People

- 1 Robert Temple, 'David Bohm', The New Scientist Interview, *New Scientist*, 11 November 1982, pp. 361–5
- 2 Richard P. Feynman, *The Character of Physical Law*, MIT Press, Cambridge, Massachusetts, 1965. (This book is the transcription of a series of lectures given by Feynman at Cornell University, which were recorded by the BBC.) I do not have a page number for this quote, as I found it given by Chris Philippidis, Christopher Dewdney, and Basil J. Hiley, in their paper 'Quantum Interference and the Quantum Potential', in *Il Nuovo Cimento*, Vol. 52 B, N. 1, 11 July 1979, p. 15, where in their footnote they omit the page number for Feynman.
- 3 Richard Feynman, *QED: The Strange Theory of Light and Matter*, Penguin Books, London, 1985, pp. 150–2
- 4 Ilya Prigogine, *Is Future Given?*, World Scientific Press, Singapore, 2003, pp. 66–75
- 5 Albert Szent-Györgyi, *Electronic Biology and Cancer: A New Theory of Cancer*, Marcel Dekker, Inc., New York and Basel, 1976, pp. 18–19
- 6 Albert Szent-Györgyi, *Bioenergetics*, Academic Press, New York, 1957, passim. The energy of the photon absorbed by the protein has to travel first through the protein molecule (and) is emitted as fluorescent light. Molecules send us messages through photons. The biological energy unit (has a) wavelength (which) corresponds to the near infrared. It is thus this spectral region which will have the greatest direct interest for the biologists. Electronic excitations give us valuable information about properties and reactions of molecules. One of the main functions of protoplasmic structures may be to generate in water those specific structures which make forms of electronic excitations and energy transmissions possible which would be improbable outside these structures. The solid matter and the water of the cell form together that unique system which has the queer property of being alive.
- 7 Albert Szent-Györgyi, *Bioelectronics: A Study in Cellular Regulations, Defense, and Cancer*, Academic Press, New York, 1968, p. vii
- 8 Ibid., p. 21.
- 9 Albert Szent-Györgyi, *The Living State: With Observations on Cancer*, Academic Press, New York, 1972
- 10 Andrew Marino, *Going Somewhere: Truth About a Life in Science*, Cassandra Publishing, Belcher, Louisiana, USA, 2010, pp. 337–9, and see also pp. 341–2.
- 11 Percy W. Bridgman, *The Physics of High Pressure*, G. Bell and Sons, London, 1949, pp. 190, 208–9

- 12 C Lobban, J.L. Finney, and Werner F. Kuhs, 'The Structure of a New Phase of Ice', *Nature*, Vol 391, 15 January 1998, pp. 268–70
- 13 *Bioenergetics*, op. cit., pp. 34–9
- 14 Freeman W Cope, 'Evidence from Activation Energies for Superconductive Tunneling in Biological Systems at Physiological Temperatures', in *Physiological Chemistry & Physics*, 3, 1971, p. 403
- 15 William A. Little, 'Possibility of Synthesizing an Organic Superconductor', in *Physical Review*, Vol 1234, No 6A, 14 June 1964, pp. A1416–24
- 16 Janos Ladik and Geza Biczó, 'A Note on F.W. Cope's Paper "Evidence from Activation Energies for Superconductive Tunneling in Biological Systems at Physiological Temperatures"', in *Physiological Chemistry & Physics*, 4, 1972, pp. 495–6
- 17 Freeman W Cope, 'Biological Sensitivity to Weak Magnetic Fields Due to Biological Superconductive Josephson Junctions', in *Physiological Chemistry & Physics* 5, 1973, pp. 173–6
- 18 J.P. Marton, 'Conjectures on Superconductivity and Cancer', in *Physiological Chemistry & Physics*, 5, 1973, pp. 259–70
- 19 Solomon Goldfein, 'Some Evidence for High-Temperature Superconduction in Cholates', in *Physiological Chemistry & Physics*, 6, 1974, pp. 261–9
- 20 K. Antonowicz, 'Possible Superconductivity at Room Temperature', in *Nature*, Vol 247, No 14, 8 February 1974, pp. 358–60
- 21 Freeman W Cope, 'Superconductive Josephson Junctions – A Possible Mechanism for Detection of Weak Magnetic Fields and of Microwaves by Living Organisms' (abstract only printed) in Tom S. Tenforde (ed.), *Magnetic Field Effect on Biological Systems* (Proceedings of the Biomagnetic Effects Workshop, 1978) Plenum Press, New York, 1979, p. 87
- 22 Emilio Del Giudice, Silvia Doglia, Marziale Milani, Cyril W. Smith, and Giuseppe Vitiello, 'Magnetic Flux Quantization and Josephson Behaviour in Living Systems', in *Physica Scripta*, Vol 40, 1989, pp. 786–91.
- 23 Vladimir Z. Kresin and William A. Little (eds.), *Organic Superconductivity*, Plenum Press, New York, 1990
- 24 *Ibid.*, p. 18, in a paper by A.M. Hermann, H. Duan, W. Kiehl and D. Weeks entitled 'Thallium-Based Copper Oxide Superconductors'

## Chapter 15: How Our Bodies Emit Light

- 1 Roeland van Wijk, *Light in Shaping Life: Biophotons in Biology and Medicine*, Meluna, Geldermalsen, The Netherlands, 2014, p. 355
- 2 It is for this reason that I have registered a website to preserve as much as possible of the scientific papers in all languages on the subject, and thousands of pages have already been scanned and turned into pdfs for download. All the publications in German and Russian, as well as the working notebooks, of Alexandr Gurvich (discoverer of biophotons) will be available for public download, because they are out of copyright. However, most of the material will only be accessible to a closed registered group because of copyright complications involving journals and publishers. But at least the archives will be preserved for posterity in this way. The most helpful person in making material available has been my friend Marco Bischof, whose enthusiasm is exceeded only by his profound knowledge.
- 3 Van Wijk, op. cit.
- 4 Vladimir Leonidovich Voikov and Lev Vladimirovich Beloussov, 'From Mitogenetic Rays to Biophotons', in Lev Vladimirovich Beloussov, Vladimir L. Voikov, and Victor Semenovitch Martynyuk (eds.), *Biophotonics and Coherent Systems in Biology*, Springer Verlag, New York, 2007, pp. 1–16

- 5 Strange and somewhat embarrassing support came from one of Himmler's S S researchers, Otto Rahn (1904–1939). Anyone interested in the bizarre career of Rahn can read about it on Wikipedia, but Wikipedia does not mention the important book by Rahn relating to biophotons, *Invisible Radiations of Organisms* (Berlin, 1936, reprinted 1944), which suggested that aging was due to the slowing and cessation of the emission of ultra-violet radiation within the body, a dubious idea. Rahn also pointed out, however, that the healing of wounds took place because of UV (ultra-violet) emissions, and that irregularities of these emissions were implicated in cancer (which we now know to be true). Rahn tried to leave the employ of Himmler, and was apparently murdered in consequence. Many of his publications were cranky, and it is thus ironical that no attention has been called to the one that was actually useful.
- 6 Joseph Needham, *Chemical Embryology*, Cambridge University Press, 1950.
- 7 Changlin Zhang, Fritz-Albert Popp, and Marco Bischof (eds.), *Current Development of Biophysics – The Stage from an Ugly Duckling to a Beautiful Swan*, Hangzhou University Press, China, no date, but 1996. (The poetic nature of the title was thought of by Zhang Changlin, who is that rare thing, a dreamy and poetic person who is also a scientist. He was based at that time in the College of Life Sciences of Hangzhou University, but today lives in the West.)
- 8 Kilmister, Clive W., *Disequilibrium and Self-Organisation*, D. Reidel, Kluwer, Dordrecht, 1986; Popp, Fritz-Albert, Warnke, Ulrich, König, Herbert L., and Peschka, Walter (eds.), *Electromagnetic Bio-Information*, Urban & Schwarzenberg, Munich, 2nd edition, 1989; Jeżowska-Trzebiatowska, Bogusława, Kochel, Bonawentura, Sławiński, Janusz, and Stręk, Wiesław (eds.), *Photon Emission from Biological Systems. Proceedings of the First International Symposium, Wrocław, Poland, January 24–26, 1986*, World Scientific, Singapore, 1987; Popp, Fritz-Albert, Li, Ke-hsueh ['K.H.'], and Gu, Qiao (eds.), *Recent Advances in Biophoton Research and Its Applications*, World Scientific, Singapore, 1992; Beloussov, Lev Vladimirovich, and Popp, Fritz-Albert (eds.), *Biophotonics – Non-equilibrium and Coherent Systems in Biology. Biophysics and Biotechnology*, Proceedings of International Conference Dedicated to the 120th Birthday of Alexander Gavrilovich Gurwitsch (1874–1954), 28 September–2 October 1994, Moscow, Bioinform Services Co., Russia, 1995; Zhang, Popp, and Bischof (eds.) see preceding footnote; Chang, Jun-Ju, Joachim Fisch, and Fritz-Albert Popp (eds.), *Biophotons*, Kluwer Academic Publishers, Dordrecht, 1998; Fritz-Albert Popp, and Lev Vladimirovich Beloussov (eds.), *Integrative Biophysics – Biophotonics*, Kluwer Academic Publishers, 2003; Shen, Xun, and Roeland van Wijk (eds.), *Biophotonics – Optical Science and Engineering for the 21st Century*, Springer Science and Business Media Inc., New York, 2005; Francesco Musumeci, Larissa S. Brizhik, and Ho, Mae-Wan (eds.), *Energy and Information Transfer in Biological Systems – How Physics Could Enrich Biological Understanding*, Proceedings of the International Workshop, Acireale, Catania, Italy, 18–22 September 2002, World Scientific, New Jersey, Singapore, and London, 2003; Lev Vladimirovich Beloussov, Vladimir Leonidovich Voelkov, and Viktor Semenovitch Martynyuk (eds.), *Biophotonics and Coherent Systems in Biology*, Springer Verlag, New York, 2007.
- 9 Marco Bischof, *Biophotonen – Das Licht in Unseren Zellen (Biophotons – The Light in Our Cells)*, Zeitausendeins, Frankfurt am Main, 1995; Michael König, *Photonen-Diagnose – Vitalität ist Messbar – Wie Lebendig Sind Sie Wirklich?*, Scorpio, Munich, 2014; Fritz-Albert Popp, *Biophotonen – Neue Horizonte in der Medizin – Von den Grundlagen zur Biophotonik*, Karl F. Haug Verlag, Stuttgart, third revised and updated edition, 2006 (originally published 1983).
- 10 Roeland van Wijk, Yu Yan, and Edouard Pieter van Wijk, *Biophoton Technology in Energy and Vitality Diagnostics – A Multi-Disciplinary Systems Biology and Biotechnology Approach*, Medusa Research, Q1 Nanophotonics, Netherlands, 2017.

- 11 Viktor Mikhailovich Inyushin, 'Bioplasma The Fifth State of Matter', in John White and Stanley Krippner (eds.), *Future Science Life Energies and the Physics of Paranormal Phenomena*, Anchor Books, Doubleday, Garden City, New York, 1977, pp. 115-20
- 12 See for instance: Karl H. Pribram, *The Form Within*, Prospecta Press, Westport, Connecticut, USA, 2013
- 13 Karl H. Pribram, *Languages of the Brain Experimental Paradoxes and Principles in Neurophysiology*, Prentice-Hall Inc., 1971, reprinted Brooks/Cole, Monterey, California, 1977, pp. 150-9
- 14 Adam Gregorz Adamski, 'Bioplasma Concept of Consciousness', in *NeuroQuantology*, Vol. 9, Issue 4, December 2011, pp. 681-91

## Chapter 16: The 'Death Flash' and the 'Life Flash'

- 1 Janusz Sławinski, 'Electromagnetic Radiation and the Afterlife', in *Journal of Near-Death Studies*, Vol. 6, Part 2, winter 1987, pp. 79-94.
- 2 Because I am interested in French literature (and indeed my wife Olivia and I have sponsored numerous translations of modern French literary classics into English), I have read widely in twentieth-century French fiction. One of the most congenial authors to me is the passionate French Anglophile, André Maurois. By chance, browsing in a bookshop some years ago, I came across a little book by him containing a novella bearing the strange title *The Weigher of Souls*, which is a direct translation of its original French title *Le Peseur d'Ames*. I now possess a first edition of this novella signed by Maurois, whose signature by the way is practically microscopic, so that you almost need a magnifying glass to read it. (He must have been a very modest person')

The book was published originally in 1931 in Paris in several simultaneous editions on different kinds of paper, and later in the same year in a version atmospherically illustrated by Francis Picabia. (I have been fortunate to acquire Maurois's own personal copy with his bookplate of this special edition. André Maurois, *Le Peseur d'Ames*, with frontispiece and eight illustrations by Francis Picabia, Antoine Roche, Paris, 1931, unnumbered author's own *exemplaire sur japon impérial*, the bookplate says 'Ex Libris Simone Andre Maurois'. Simone de Caillevet was the second wife of Maurois and died in 1968, a year after he did. It seems that they shared their bookplate.)

Also in the same year, the English translation appeared in America in the popular highbrow magazine *Scribner's*, for March 1931. That issue announces prominently on the cover 'André Maurois's New Novel "The Weigher of Souls" Complete in this Issue.' I also have its first edition in English as a book, published in the same year by D. Appleton & Company in association with Scribner's, in both London and New York. Despite the prominence with which this title was thus originally launched, it seems to have attracted only limited attention, which I also find curious. The French were always somewhat uncomfortable about Maurois, because he liked the English too much, and also because he was a Jew (Maurois was his pen name, and his real surname was Herzog).



André Maurois (1885–1967), the author of *The Weigher of Souls*

Today, if you ask someone in France about Maurois, the person will either look blank or pretend to look blank. After all, grumbling about the barbaric nature of les ros bifs ('the roast beefs') who live across the English Channel is one of the favourite hobbies of the French, and one that they do not wish to see compromised by too much Anglophilia. Hence, it has been convenient largely to 'forget about' both Maurois and his contemporary French Anglophile, the novelist Valéry Larbaud, who translated James Joyce's *Ulysses* into French.

Maurois met with tremendous literary success in Britain with his series of Colonel Bramble novels, light-hearted and comic accounts of the British soldiers during the First World War, written in a tone of great affection. Maurois had been a French military liaison officer with a British regiment just behind the Front for most of the war. He was thus unusual in that he was a French officer who spent the war in the company of British officers rather than French ones.

- 3 Wilfried-René Cheticoan (note that Wilfried is misspelled Wifried in this source), 'The Process of Birth and Reincarnation Theory', in the Proceedings and Abstracts of the 6th International Conference on Psychotronic Research held at Zagreb, Yugoslavia, 13–16 November 1986, published by the Society for Natural Sciences at Zagreb in 1987 (though no publication date is given), the volume apparently being edited by Zdenek Rejda, p. 314. (The main title of this book is in Czech, with the English title beneath.)
- 4 Duncan MacDougall, 'Hypothesis concerning Soul Substance together with Experimental Evidence of the Existence of Such a Substance', in *Journal of the American Society for Psychical Research*, 1 (1), 1907, p. 237, also 'The Soul Hypothesis concerning Soul Substance together with Experimental Evidence of the Existence of Such Substance', in *American Medicine*, 2, April 1907, pp. 240–3. A popular report of this appeared in *The New York Times*, entitled 'Soul Has

Weight, Physician Thinks', 11 March 1907, this appeared before MacDougall's own articles had even been published later that year. See the Wikipedia entry '21 Grams Experiment'. Apparently, MacDougall's experiments of 1907 have never been repeated.

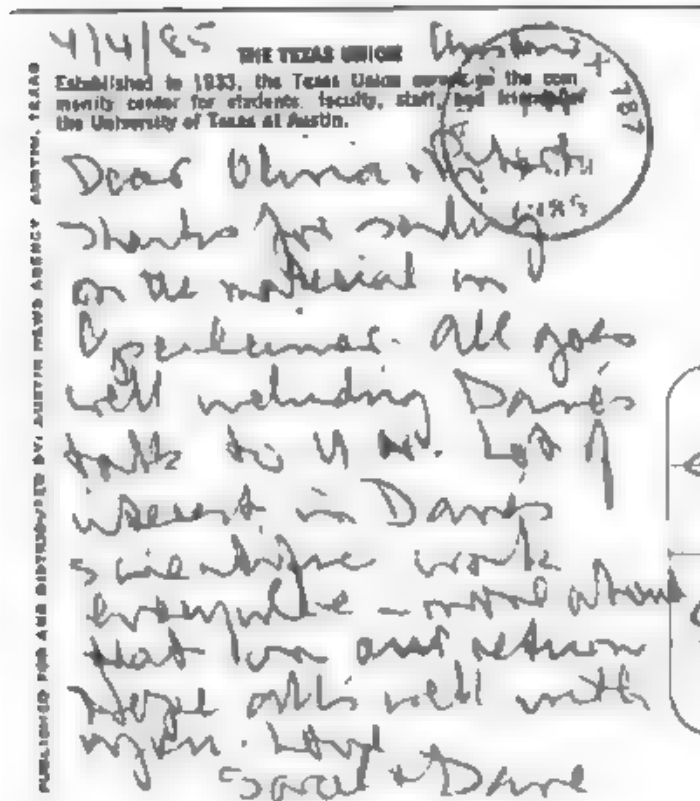
- 5 This account is to be found on the website [www.thebiggeststudy.blogspot.com/2012/12/the-must-at-death.html](http://www.thebiggeststudy.blogspot.com/2012/12/the-must-at-death.html)
- 6 Sheila Ostrander and Lynn Schroeder, *Psychic Discoveries behind the Iron Curtain*, Prentice-Hall Inc., Englewood Cliffs, New Jersey, USA, 1970, p. 205
- 7 Konstantin Korotkov, *Aura and Consciousness: A New Stage of Scientific Understanding*, translated from the Russian by Roger Taylor, State Editing & Publishing Unit 'Kultura', St Petersburg Division of the Russian Ministry of Culture, St Petersburg, 1998, 2nd edition, 1999
- 8 Janusz Stawinski, 'Photon Emission from Perturbed and Dying Organisms: The Concept of Photon Cycling in Biological Systems', in Fritz-Albert Popp and Lev Belousov (eds.), *Integrative Biophysics: Biophotonics*, Kluwer Academic Publishers, Dordrecht, Netherlands, 2003
- 9 This story about Franz Werfel is not generally known. It was told to me by my dear friend Professor Adolph Klarmann, the editor of Werfel's collected works (in German), a close friend of Werfel and the guardian and confidante of Werfel's widow, Alma Maria Gropius Mahler Werfel, whom he looked after in New York in her last years. I intend to publish more about this in a separate publication.
- 10 Jelena Vuckovic, Dirk Englund, David Fattal, Edo Waks, and Yoshihisa Yamamoto, 'Generation and Manipulation of Nonclassical Light Using Photonic Crystals', in *Physica E: Low-dimensional Systems and Nanostructures*, 32 (1-2), July 2005, DOI: 10.1016/j.physe.2005.12.135 (See arXiv website.) This paper was subsequently replaced with a revised version. Although this paper is not available on Researchgate, one can request a full text from the authors via [www.researchgate.net](http://www.researchgate.net), though it means scrolling down an immensely long chronological list of publications by Vuckovic, who seems to have been more prolific with words than either Tolstoy or Proust. (England has meanwhile moved to MIT, Fattal is still at Stanford, and Edo Waks and Yamamoto are not on Researchgate.net.)
- 11 Barbara W. Chwirut, 'Do We Always Need to Know Molecular Origin of Light Emitted by Living Systems?', in Chang Jun-Ju, Joachim Fisch, and Fritz-Albert Popp (eds.), *Biophotons*, Kluwer Academic Publishers, Dordrecht, 1998, pp. 229-37
- 12 Raymond Moody, *Glimpses of Eternity*, Guideposts, New York, 2010, pp. 101-4.
- 13 Ibid., p. 24
- 14 Ibid., pp. 101-2.
- 15 Ibid., p. 103
- 16 Bernard J.F. Laubscher, *Beyond Life's Curtain*, C.W. Daniel Co., Spearman, 1975.
- 17 Peter and Elizabeth Fenwick, *The Art of Dying*, Bloomsbury Continuum, London, 2008, pp. 160-3
- 18 Ibid., p. 167
- 19 Reported by Dr. Robert Crookall in his book *Out of the Body Experiences*, Citadel Press, 1970
- 20 Report by Ed Bodin for the magazine *Psychic Observer*, 25 January 1945. I have taken this information from a blog on the internet posted in 2010 by Michael Tynn, author of the book *The Afterlife Revealed: What Happens After We Die*, 2011.
- 21 Michael Otmar Hengartner, 'Out-of-Body Experiences: Cell-Free Death', in *Bioessays*, 17 (6), June 1995, pp. 549-52.
- 22 Xianrui Cheng and James E. Ferrell Junior, 'Apoptosis Propagates through the Cytoplasm as Trigger Waves', in *Science*, 361 (6402), 10 August 2018, pp. 607-12. Please note that although the official listing at the head of the article suggests that the paper is only five pages long, it is in fact 14 pages long in the downloadable Public Access author manuscript dated 29 November 2018, so that the reference is therefore misleading.



- 23 R.J.P. Williams, 'Purpose of Proton Pathways', in *Nature*, Vol. 376, No. 6542, 24 August 1995, p. 643
24. Vlaiil Petrovich Kaznacheev (aka Kaznacheyev), et al., 'Distant Intercellular Interactions in a System of Two Tissue Cultures', in *Psychoenergetic Systems*, Vol. 1, No. 3, March 1976, pp. 141-2.
- 25 See for instance: <https://www.sciencealert.com/scientists-just-captured-the-actual-flash-of-light-that-sparks-when-sperm-meets-egg> (which is dated 27 April 2016)

## Chapter 17: Our Plasma Selves

- 1 Aleksandr Samuilovich Presman, *Electromagnetic Fields and Life*, translated by F.L. Sinclair and edited by Frank A. Brown, Plenum Press, New York and London, 1970. The original Russian edition, *Elektromagnitnye Polya I Zhivaya Priroda*, was published by Nauka ['Science'] Press of Moscow in 1968.
2. Ibid., pp. 5-6.
- 3 Robert Temple, *The Genius of China 3000 Years of Science Discovery & Invention*, with Foreword by Joseph Needham, Andre Deutsch, London, 2007
4. Paul Alfred Weiss, *Principles of Development A Text in Experimental Embryology*, Henry Holt and Company, New York, 1939. Paul Alfred Weiss should not be confused with Paul Weiss the philosopher. Later publications by Weiss, not cited by Presman, include *Dynamics of Development Experiments and Inferences*, Academic Press, New York and London, 1968, and *The Science of Life The Living System A System for Living*, Futara Publishing Company, Mount Kisco, New York, 1973.
- 5 Presman, op. cit., p. 249
6. Robert Temple, 'David Bohm', in *New Scientist*, London, 11 November 1982, pp. 361-6. A whole line of type was left out, and other errors appeared in the published article. I urge people interested in David Bohm to download for free a pdf of this article with my hand corrections, including the missing line of type. It may be obtained from my entry on [www.researchgate.net](http://www.researchgate.net). Just type in my name, click on my publications, and scroll down the chronological list until you get to 1982, and there it is.
- 7 David Bohm, *Quantum Theory*, Prentice-Hall Inc., New York, 1951. David signed my copy of the original edition.
8. Here is a scan of a postcard that Saral sent to us, to show the nature of the friendship, sent from America on their trip there in the spring of 1985. It reads 'Dear Olivia & Robert, Thanks for sending on the material on Oppenheimer. All goes well including Dave's talk to U.N. Lots of interest in Dave's scientific work everywhere - more about that on our return. Hope all's well with you. Love Saral & Dave.'



- 9 Paavo Pytkäinen, *Mind, Matter and Active Information: The Relevance of David Bohm's Interpretation of Quantum Theory to Cognitive Science*, Reports from the Department of Philosophy, No. 2, University of Helsinki, Finland, 1992, p. 66
10. David Bohm, 'A Suggested Interpretation of the Quantum Theory in Terms of "Hidden Variables" Part I (14 pages), 15 January, pp 166-79, and Part II (14 pages), 15 January, pp 180-93, in *Physical Review*, American Physical Society, Vol 85, Second Series, 1 January-15 March 1952. At the time of writing he was still based at the Palmer Physical Laboratory at Princeton, and his papers are marked received on 5 July 1951, but a note says 'Now at Universidade de Sao Paulo, Faculdade de Filosofia, Ciencias e Letras, Sao Paulo, Brazil (I have an original bound volume containing these papers)'. So between the time of submission and publication, Bohm had had to flee the country and seek refuge in the philosophy department of a university in Brazil, where he did not even have a science position.
- 11 I need to explain to the reader that the aspect of David Bohm's thinking that we are dealing with here is a later outgrowth of his main ideas. I have discussed the theories of Louis de Broglie and David's impact on them at some length here: Robert Temple, 'Is Particle Mass a Function of Degrees of Freedom?', in *Journal of Cosmology*, Vol 26, No 3, 2017, pp 13995-14090. Downloadable as a pdf from my entry on [www.researchgate.net](http://www.researchgate.net), under the date 2017.
- 12 This point relates to one of my own major points made in my lengthy 2017 paper (just mentioned), regarding the crucial importance of amplification in every aspect of science, and where I said for instance 'Amplification in electronics turns a weak signal into a strong signal, and it does not necessarily require an amplifier, such as we in our macroscopic world employ, because it apparently occurs spontaneously at the ultra-weak level in Nature in electron streams under the influence of magnetism.' See page 20 and passim in my paper.

- 13 David Bohm and F David Peat, *Science Order and Creativity*, Bantam Books, New York, 1987, p. 93
- 14 David Bohm, 'A New Theory of the relationship of Mind and Matter', in *Philosophical Psychology*, Vol 3, No. 2, 1990, pp. 271–86.
- 15 Pyllkänen, op. cit.
- 16 Paavo T I Pyllkkanen, *Mind Matter and the Implicate Order*, Springer Verlag, Berlin and Heidelberg, 2006
- 17 Pyllkänen, 1992, op. cit., p. 91.
- 18 As is usual with Wikipedia, Rupert's entry on it is riddled with vitriol and insults against him, Wikipedia being apparently partial to the most intensely partisan and extreme attacks on people whose names are on whatever black list it is that they consult. When people like Rupert attack the stupidities and idiocies of Establishment ideas, the Establishment strikes back. Most of the famous scientists mentioned in this book were savagely attacked during their lifetimes because they thought for themselves  
Rupert told me that when he was a student at Cambridge, he was told in lectures that there was a man named Peter Mitchell who was crazy and none of the students should pay any attention to his ideas if they should ever come across them. That is the same Peter Mitchell, my good friend whom I have mentioned before, who won the Nobel Prize after a lifetime of being called crazy and labelled even in lectures given to students at Cambridge such as Rupert. Cambridge is also the place from which Sir Fred Hoyle was driven by relentless and vicious personal attacks led by a cabal of snobbish enemies who, among other things, did not like Fred's Yorkshire accent and his lowly origins. The world of learning can be more poisonous even than the world of politics
- 19 Joseph Glanvill, *Scepsis Scientifica or Confest Ignorance the Way to Science*, London, 1665, p 17.
- 20 For decades I have said to friends that the reason why I can walk into a library of three million books on open shelves (such as the one at my university when I was in my teens), go down an apparently random aisle, reach up to an apparently random shelf, and without looking at it pick the book I need and open it to the page I require is that I am able 'to see directly into Information Space' Since I have been doing this all my life, when I speak of Information Space and 'the Universe as Information', my natural scepticism dissolves into something approaching certainty. In other words, even though I do not believe in belief, thus I not only believe but know
- 21 Nikola Tesla, op. cit., pp. 9–14.
- 22 Benjamin Schumacher and Michael Westmoreland, *Quantum Processes Systems, and Information*, Cambridge University Press, 2010, p. 1.
- 23 Wojciech Hubert Zurek (ed.), *Complexity, Entropy, and the Physics of Information The Proceedings of the Workshop on Complexity Entropy and the Physics of Information Held May-June 1989 in Santa Fe, New Mexico*, Vol VIII, Santa Fe Institute Studies in the Science of Complexity, Westview Press, 1990, reprint by CRC Press, Baton Rouge, Florida, 2019
- 24 Werner G Teich and Gunter Mahler, 'Information Processing at the Molecular Level Possible Realizations and Physical Constraints', in *Ibid.*, pp. 289–99
- 25 Seth Lloyd, 'Valuable Information', in *Ibid.*, pp. 193–7.
- 26 Robert Temple, *Netherworld*, Century, London, 2002. The relevant section of this book is the final chapter, entitled 'Higher-Order Events', this chapter has been extracted from the book and may be downloaded from my [www.researchgate.net](http://www.researchgate.net) entry under the date of 2002 (as the entries on the website are chronological).
- 27 *Ibid.*, p. 354 (UK edition). I might add for those interested in the prehistories of ideas that the main ancient proponent of voids occurring in matter was the philosopher Strato of Lampsacus (335 BC–269 BC). He was the second successor of Aristotle as the Head of the Lyceum, though he could not have known him because he was only a boy when Aristotle died. His works are lost except for fragments and testimonia, which have been gathered and translated in the volume

Marie-Laurence Desclos and William W Fortenbaugh, *Strato of Lampsacus Text, Translation, and Discussion*, Vol XVI of the series Rutgers University Studies in Classical Humanities, Transaction Publishers, New Brunswick, New Jersey, USA, 2011. The fragments relating to void (*kenon* in Greek) are found on pages 70–83.

Most were preserved by Simplicius, who disagreed with him, in his Commentary on Aristotle's *Physics*. On page 79 we find Simplicius saying this: 'Strato of Lampsacus tries to show that void divides the whole of body, so that it is not continuous'. And on the same page and following we find Hero in his *Pneumatica* saying that there are voids in matter. And he adds: 'It is also clear that there are voids in water. There are many other demonstrations of the nature of the void. Every body is composed of small bodily particles, between which there are scattered voids which are smaller than the particles'.

Part of Hero's extended discussion is directly drawn from Strato. This volume concerning Strato is part of an extended series of collections of the fragments and testimonia of the Peripatetic philosophers. I am very fortunate to have enjoyed the jolly company and warm friendship of Bill Fortenbaugh, who has been a genuine culture hero and shining light in the world of classical studies in our time.

28. Vadim Nikolaevich Tsytoich (aka Cytovich), Sergey Vladimirovich Vladimirov, and Gregor Eugen Morfill, 'Size of Dust Voids as a Function of the Power Input in Dusty Plasmas', in *Journal of Experimental and Theoretical Physics*, Vol. 102, 2006, pp. 334–41. (The attentive reader will notice that Tsytoich is the man who has been quoted by me as suggesting that complex dusty plasmas can become life forms.)
29. Osamu Ishihara and Noriyoshi Sato, 'Attractive Force on Like Charges in a Complex Plasma', in *Physics of Plasmas*, Vol. 12, 070705 (2005). There is a drawing of a plasma void as Figure 2 in that paper. This work was done for the United States Air Force Research Agency.
30. Osamu Ishihara, 'Report on Study of Cryogenic Complex Plasma', report date 5 November 2008, submitted to the funding agency, the Asian Office of Aerospace Research and Development (AOARD), an extension in Asia of the US Air Force Research Agency, reporting to the Air Force Research Laboratory at Kirtland Air Force Base near Albuquerque, New Mexico. This Report appears in a collection of material entitled 'Charged Colloidal Structures in Plasmas', declassified and released by the US Department of Defense, no date.
31. Xiao-Qiong Wang, et al., 'Evidence of an Atomic Chiral Superfluid with Topological Excitations', in *Nature*, Vol. 596, No. 7871, 12 August 2021, pp. 227–31.

## Chapter 18: Wrapping Up the Universe

1. Robert Temple, *Open to Suggestion*, The Aquarian Press, Wellesborough, Northamptonshire, England, 1989. The relevant discussion constitutes the final chapter in the book pp. 361–458. The ideas which I propounded in that chapter were praised by Professor Ernest R. ('Jack') Hilgard, Former President of the American Psychological Association, and also by Professor John Taylor, who told me that he had adopted many of my concepts and suggestions for his neural network team at Kings College London, and that I had therefore contributed towards an advance in neural network science, for which he thanked me.

The book's publication in the USA was blocked by the CIA, as I was informed by no less than eight American publishers who had been personally visited and warned not to publish the book. This had the indirect result of giving the UK an advantage in neural network science, since no one in America was able to obtain the book (no international Amazon sales existed then).

2. This paper, entitled 'Early Einstein Completed', was published in June 2019 and may be downloaded from my [www.researchgate.net](https://www.researchgate.net) entry, by looking for that date, as the entries are chronological.

- 3 David Bohm and Basil J. Hiley, *The Undivided Universe: An Ontological Interpretation of Quantum Theory*, Routledge, London, 1993, p. 140

## *Appendix One*

### **KORDYLEWSKI DUST CLOUDS: COULD THEY BE COSMIC “SUPERBRAINS”?**

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#### **Abstract**

Recent astronomical observations combined with dynamical simulations have led to a possible confirmation of the existence of the much disputed stable dust clouds (Kordylewski Dust Clouds) at the Lagrange libration points of the Earth-Moon system. The new data leads to an estimate of the size of the cloud at L5 as well as of the average radii of the scattering polarizing dust particles in the cloud's interior. The diameter of the cloud is somewhat less than 3 times the Earth's diameter, and the average grain radius is estimated at  $\sim 3 \times 10^{-5}$  cm, consistent with bacterial-type cells, with a mean separation of less than 1 cm. Such grains, most likely elongated on the average (rod-like bacteria), and photoelectrically charged to a few eV, would acquire a spin through collisions with gas atoms and thus could act as emitters and absorbers of longwave electromagnetic radiation. We speculate that the entire Kordylewski Dust Cloud comprised of such particles has the potential to acquire electromagnetic connectivity with an information storage/processing capacity akin to a form of intelligence.

#### **1. Introduction**

The existence of large stable dust clouds at the Lagrange libration points L4 and L5 of the Earth-Moon system appears to have been finally confirmed by a combination of numerical dynamical simulations and polarimetric studies (Sliz-Balogh et al, 2018, 2019). An initial tentative observation of such clouds was reported in 1961 by the Polish astronomer Kazimierz Kordylewski following



which they came to be known as Kordylewski Dust Clouds (KDC) (Kordylewski, 1961). The existence of these clouds has, however, been questioned for over 3 decades mainly because of the difficulty of interpreting minute enhancements of night sky brightness in relation to other possible causes. There were also early attempts to detect centimetre to metre-sized bolides in the putative KD clouds using RADAR with negative results and these have been widely considered as disproof of their existence (Roosen and Wolff, 1969, see also, Hou et al, 2015). It is clearly desirable to repeat the earlier RADAR observations and also possibly deploy LiDAR (*Light Detection And Ranging*) measurements to look for returns from smaller particles to establish their presence.

In two recent publications Shiz-Balogh et al (2018, 2019) focussed their attention on the particular dust cloud (KDC) at the L5 point of the Earth-Moon system using sensitive polarimetric techniques. They found clear evidence that a cloud of submicron dust does indeed exist there through examination of polarized scattered light that varied with time (Shiz-Balogh et al, 2019). The cloud appeared to be “dynamic” and contained within it smaller dust clouds, perhaps displaying a cellular-like structure. Although evidence was cited to support the presence ferric and silicate particles we cannot rule out, on the basis of available evidence, the presence of a dominant contribution of carbonaceous or organic grains, as indeed is known to be predominantly present in the interplanetary zodiacal cloud, in cometary dust, as well as the interstellar medium (Hoyle and Wickramasinghe, 2000; Steele et al, 2018).

Further definitive confirmation of the existence of KDC’s is clearly desirable and we hope this will be done. It will also be important to unravel the fine structure within clouds, including their internal dynamic properties, but these cannot easily be studied from Earth. Such studies will require investigation by dedicated satellite and astronomical studies at some future date.

In this article we explore some interesting features of these dust clouds particularly if they are comprised of particles that include a significant biological component.

## 2. Inferred Properties of the L5 KDC

The stability and existence of a KDC at the L5 point has been modelled using 3-D by dynamical simulations, and its actual existence confirmed by means of polarimetric observations of scattered light (Shiz-Balogh et al, 2018, 2019). The inferred angular extent of the scattering dust cloud at L5 has been estimated at between  $\theta=6$  and 7 degrees. At the known distance of L5,  $r = 3.84 \times 10^9$  cm, this angular extent transfers to an average cloud diameter  $D$  given by

$$D \approx \frac{\theta}{360} 2\pi r \approx 4.35 \times 10^8 \text{ cm} \quad (1)$$

This is to be compared with the Earth’s diameter of  $\sim 1.27 \times 10^8$  cm.

For a spherical particle of radius  $a$  (silicate grain or an organic grain typified for example by a bacterium) the cross-section for scattering of sunlight is

$$C_{scs} \approx Q_{scs} \pi a^2 \quad (2)$$

with  $Q_{scs}$  having a value close to 1 at optical wavelengths (eg Wickramasinghe, 1973). For an assembly of such grains in the cloud the average mass scattering coefficient is thus

$$\kappa_{sca} \cong \frac{\pi a^2 Q_{sca}}{4\pi a^2 s} \cong \frac{3}{4as} \text{ cm}^2 \text{g}^{-1} \approx 2.5 \times 10^4 \text{ cm}^2 \text{g}^{-1} \quad (3)$$

assuming  $a \sim 3 \times 10^{-5} \text{ cm}$ ,  $s \sim 1 \text{ g cm}^{-3}$ .

For significant polarization effects to be observable (Sliz-Balogh et al, 2019) the scattering optical depth through the  $4.35 \times 10^8 \text{ cm}$  path-length of the cloud (equation (1)) must be of order unity, say for instance,  $\tau_{sca} \approx 0.3$ . This converts to a mass density of bacterial dust  $\rho$  in the cloud given by the equation

$$0.3 \cong \kappa_{sca} D \rho \cong 1.09 \times 10^{13} \rho \quad (4)$$

with the diameter of the cloud given by (1), thus yielding a mass density

$$\rho \approx 2.75 \times 10^{-14} \text{ g cm}^{-3} \quad (5)$$

The Kordykewski dust cloud at L5 on this basis has a density which is at least  $10^9$  higher than the density of the ambient interplanetary dust (Allen, 1963). Losses due to the effects of solar radiation, as well as the solar wind effects and small gravitational perturbations which occur mostly in the outermost regions of the KDC will, over long timescales, be made good by the acquisition of new dusty material from comets and the interplanetary medium. The total mass of the cloud observed by virtue of (1) and (5) is thus  $\sim 1.17 \times 10^{12} \text{ g}$ .

Assuming that a typical dust particle in the cloud has the size characteristics of a bacterial spore with a particle radius  $a \sim 3 \times 10^{-5} \text{ cm}$  and mass density  $\sim 1 \text{ g cm}^{-3}$ , we therefore have an average *number* density of dust particles in the cloud of

$$n \approx 2.43 \text{ cm}^{-3}. \quad (6)$$

The mean distance between neighbouring particles is then

$$\sim n^{-1/3} \sim 0.74 \text{ cm!} \quad (7)$$

very short indeed, and yielding the possibility of inter-particle “communication” if electromagnetic signals can be exchanged. This could be made possible because the bacterial dust would be charged to a potential of a few volts due to the photoelectric effect caused by absorption of solar ultraviolet photons, and collisions with ambient gas would lead to rotation (spinning) at radio frequencies as had been discussed many years ago by Hoyle and Wickramasinghe (1970)

### 3. Emergent properties of KDC's

Spinning charged grains, particularly those in the form of elongated needles typified by bacilli, would be efficient absorbers and emitters of electromagnetic radiation. Most interestingly the total number  $N$  of such charged dust particles in a KDC (distance of  $< 1 \text{ cm}$  apart) would be truly vast

$$N \approx \frac{4\pi R^3}{n} \approx 2 \times 10^{26} \quad (8)$$



With electromagnetic-wave emission/absorption across cloud dimensions as well as electrical connections (charge/current exchanges) between adjacent charged particles just centimetres apart, a KDC, might well be able to function as a gigantic computer/brain capable of storing and processing digital information. We are reminded in the present context of the well-attested cooperative behaviour of bacteria in a wide range of terrestrial settings (Asfahl and Schuster, 2017, Mitchell and Kogure, 2006)

A human brain has only some  $10^{11}$  brain cells, and about  $10^{15}$  synapses. A KDC (from (8)) may well have a total number of binary connections

$$\sim {}^N C_2 \approx 10^{52}$$

between its constituent oscillators, so defining a super-astronomical sum total for its potential computing power. This estimate exceeds the computing power available in all human brains and indeed all other intelligent life on Earth as well by very many orders of magnitude.

Finally, we refer to a few of the remarkable features that are known to characterise dusty complex plasmas and which could also play a role in the present context (eg Bouchoule, A., 1999, Mikikian *et al.*, 2018). The nucleation and growth of mainly siliceous dust within such plasmas have been documented in several laboratory studies. In our case, however, the dust nucleation process will be side-stepped and condensation within KDC's is likely to occur upon pre-existing interplanetary dust particles which we already argued will probably have a biological component. Thus, we could envisage a population of bacterial particles coated with semi-conducting siliceous mantles that may well have the effect of enhancing inter-particle electronic connectivity. Such speculations may sound far-fetched but they lie within a broad framework of possible outcomes based on known behaviour of complex dusty plasmas.

We might thus be tempted to view the Lagrange Dust Balls as highly structured “intelligent” systems capable of storing and processing “information” that they may have more surprising and unexpected features. Indeed, such huge stable entities which have presumably endured for astronomical timescales and have steadily grown in complexity over billions of years may display spontaneously evolved phenomena which might resemble those of the most highly complex living entities. This situation is not dissimilar to the brain-like complexity of the “cosmic web” discussed by Ginsburg *et al.* (2019), although it is potentially even more impressive in its computational potential.

It is often said anecdotally that the human brain contains more neurons than there are observable stars in the night sky. But the human brain only fits inside a small skull. A stable dusty complex plasma ball of immense size which has possibly endured for aeons and experienced continual growth and expansion over countless millennia is in principle capable of developing something resembling a much more complex nervous system than a human brain with its average lifetime of  $\sim 10^2$  years. A complex dust cloud (KDC) which has existed for many millions of years might even have become self-aware – with all that this implies. It is conceivable that Fred Hoyle's fictional Black Cloud has a reality in the context of KDC's – which of course he could not have recognised in 1957 (Fred Hoyle, 1953).

## Acknowledgement

We are grateful to Professor Michael Smith for comments that helped improve an earlier version of this paper.

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## Appendix Two

## OBITUARIES

## Peter Mitchell

**CORRECTION:** The conversation reported in the second paragraph of restaurant's obituary of Peter Mitchell took place in 1992, not 1950, as printed.

**PETER MITCHELL**, who was one of the most brilliant and original of British men of science though he was little known outside his field until he received the Nobel

Mitchell was modest, perhaps expectedly so, in recalling the 100th year in 1951. "I suppose that in a few years' time nobody will even remember me," Asa had believed that the shared problem of any Asa and Asas "for calls worried in having attendance 10-12 to me as a pastor. Two women who wrote the five topical articles about her in 1951 in New Zealand" started "to ask more about her than man could evolve a good natured interest on the telephone asking if we mirrored this, with a few others."

[illegible]

self. He was the basis for the main character in Michael Mullury's book *Pandora*. But what deal with the friendship is a written personality to their work.

[illegible]

At Peter Mitchell had his to be subject to peer review and to apply for grants he would have had little time left for his work and beyond his own "critical appraisals" anyway, thus leaving no time to do his own research, where the spirit of Mitchell's special research was but he could not bear anybody to know about it. At all times he would be the inevitable "Man-It-Occurs-to-Me" person in the world who could be the only one to do the existing work of his and will it in French, whose passionate devotion both to Peter the man and to his work gave him the emotional and the needed premeditated patience to do the work and the spiritual strength to go to the end of his work.



and Peter's coownership of the wines meant that meals at home were always a Michelin-quality experience.

was Dr. transfer him to his research assistant from 1944 until his retirement a few years ago. When I was in college, I met him and we became very close. For 30 years, Minge was admired, respected, and I think loved by his professional supporters because of his scientific openness. I think that students were reassured by his lack of pretense and his ability to deal with people who were not as intelligent as he was. In many ways he was a great teacher. His colleagues who work with him are threatened by his work because in the 1950s, he was a leader in the field of nuclear physics. He was one of the first to show that the electron spin was important in the study of the nucleus. He was one of the first to show that the electron spin was important in the study of the nucleus. He was one of the first to show that the electron spin was important in the study of the nucleus.

recipies. But simply if used to be thought that the sun are also participants on a certain food and that the energy absorbed by animals and humans from food, and brought from sunlight, was what has been used into the energy means say to run the body by purely chemical means. The scientist "they" enforces theory which postulated wisdom and unconscious processes. But Mitchell's argument was: indicate to create his lunch eat; in fact that "beers was a little less in the future of life" and one summer later he is demonstrated that currents, not photons, are the cause of photosynthesis.

[illegible]

The 25 years of Mitchell's life were spent largely doing a same thing, in his inimitable style. He was never tired of his philosophical ideas which he wanted to pursue and elaborate. He was devoted to this desperate fighting as he had no other

to offer up the areas of his other interests as he had a wife, a son, but one effort is left short: not with a man and his philosophical proclivities "indeed to be known only to a few friends such as Su Kai Poppel whom he 'entered' Mico-rill has highlighted the Socrates as Glynn Valley the historical Socrates restored old buildings and worked in stone as Mattel dad, and they both devoted themselves to philosophical questioning of a deeply profound level of conversation.

But, as we saw above, the story of the great man – which, having all the promise, should never have been to be – is the quest of the Cornwall retreat which it can only call a great and old soul. His name was John, a gentle and serene and sophisticated, as he turned to carefully the desires to abuse from jealous and petty old jealous without reason in the heat of flame towards love. However, outstanding but his elements in society, his human qualities were of a rather odd still.

Robert T. Gable

First: Dennis Haddock, DuPont chemist from Maryland, 1929-79 September 1929 Female and Director of Research, Glaxo Research Laboratory, 1944-48, 1958-1974 Nobel Prize for Chemistry 1978, Chairman and Honorary Director, Glaxo Research Institute, 1978-82 Visiting Professor, King's College, London 1981-89, retired, Esher, Surrey. One son and one daughter, marriage dissolved, 1956 (first marriage dissolved), 1956 (first marriage dissolved) died, Glaxo, 1981 10 April 1992

## Appendix Three

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# Index

Abrahamson, John [here](#)  
*Account of the Lapps of Finmarken, An* (Leem) [here](#)  
'Activation Energies of Acceleration and Hypoxia Stress' (Cope) [here](#)  
Adamski, Adam Grzegorz [here](#)  
*Advances in Astrophysics* [here](#)  
*athēr* [here](#), [here](#), [here](#)  
Alexander the Great [here](#)  
Alfvén, Hannes (1908–1995) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
Alfvén waves [here](#), [here](#)  
'Angel Kebala' [here](#)  
'Angel of the Lord' [here](#), [here](#)  
Antonowicz, Antoni Kanstantinavich (aka Antanas Antanavičius, 1910–1918) [here](#)  
*Apocalypse of Abraham*, [here](#)  
*Apocalypse of Adam, The* [here](#), [here](#)  
*Apocryphon of John, The* [here](#), [here](#), [here](#)  
Aristotle xiii, [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
Armutage, Hanae [here](#)  
*Art of Dying, The* (Fenwick and Fenwick) [here](#)  
artificial intelligence (AI) [here](#), [here](#)  
*Atmosphere and Ionosphere. The Elementary Processes. Discharges and Plasmoids* (Bychkov et al. (eds.)) [here](#)  
*Atmospheric Plasma Physics* (Nishida) [here](#)  
Aurora Borealis  
    and Aristotle [here](#)  
    and charged particles from the Sun [here](#), [here](#), [here](#)  
    first named [here](#)  
    and Jean-Jacques d'Ortous de Mairan [here](#)  
    and Kristian Birkeland [here](#), [here](#), [here](#), [here](#)  
    observations of [here](#)  
Avco Corporation [here](#)  
  
ball lightning  
    author's experience of [here](#)  
    composition of [here](#), [here](#)  
    control of by intelligent life [here](#)  
    early studies on [here](#)  
    intelligence of [here](#)  
    military applications [here](#)

and paranormal activity [here](#)  
 and plasma crystals [here](#), [here](#)  
 as plasmoid [here](#)  
 research on [here](#)  
 as soliton phenomenon [here](#)  
*Ball Lightning* (Stenhoff) [here](#)  
*Ball Lightning and Bead Lighting* *Extreme Forms of Atmospheric Electricity* (Barry) [here](#)  
*Ball Lightning* *Paradox of Physics* (Sagan) [here](#)  
*Ball Lightning* *An Unsolved Problem in Atmospheric Physics* (Stenhoff) [here](#)  
 Barry, James Dale [here](#), [here](#)  
 baryogenesis (baryon creation) [here](#), [here](#)  
 baryon particles [here](#)  
*batos* [here](#)  
 Baule, Gerhard M. [here](#), [here](#), [here](#), [here](#), [here](#)  
 Becquerel, Henri (1852–1908) [here](#)  
 bees, positively charged information carriers [here](#), [here](#)  
 Belousov, Lev Vladimirovich (1935–2017) [here](#), [here](#), [here](#), [here](#)  
 Benkadda, Sadruddin [here](#)  
 Bennett, Willard (1903–1987) [here](#), [here](#), [here](#)  
 Bennett Pinches [here](#)  
 Bergrun, Norman Riley (1921–2018) [here](#), [here](#)  
 Berry, Michael [here](#)  
 Berry Phase [here](#)  
 Bevan, T.D.C. [here](#)  
*Beyond Life's Curtain* (Laubscher) [here](#)  
*Bioelectronics* (Szent-Györgyi) [here](#), [here](#), [here](#)  
*Bioenergetics* (Szent-Györgyi) [here](#), [here](#), [here](#), [here](#), [here](#)  
 bioinformation [here](#)  
 biophotons [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 bioplasma [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 bioplasma bodies [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 'Bioplasma, The Fifth State of Matter?' (Inyushin) [here](#)  
 Birkeland, Kristian (1867–1917) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Birkeland Currents [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 'Birkeland Currents: A Force-Free Field-Aligned Model' (Scott) [here](#)  
 Bischof, Marco [here](#), [here](#), [here](#)  
*Black Cloud, The* (Hoyle) [here](#), [here](#)  
 Blackett, Patrick (1897–1974) [here](#)  
 Block, Dietmar [here](#)  
 Bohm, David Joseph (1917–1992) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Bohm, Saral [here](#), [here](#)  
 Bonitz, Michael [here](#)  
*Book of Caverns* [here](#)  
*Book of Enoch* [here](#), [here](#)  
 Boole, George (1815–1864) [here](#)  
 Borges, Jorge Luis (1899–1986) [here](#)  
 Bos, Abraham P. [here](#)  
 Bostick, Winston Harper (1916–1991) [here](#), [here](#), [here](#), [here](#)

boundary layers [here](#), [here](#), [here](#)  
 Bova, Benjamin William (1932–2020) [here](#)  
 Brahe, Tycho (1546–1601) [here](#)  
 brain as hologram [here](#), [here](#)  
 brain, human [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 brain, inorganic [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Bramwell, Steve [here](#)  
 Bridgman, Percy Williams (1882–1961) [here](#), [here](#), [here](#), [here](#), [here](#)  
 Brillouin, Léon (1889–1969) [here](#)  
 Brillouin Zones [here](#), [here](#)  
 Bruno, Giordano [here](#)  
 Burkert, Andreas [here](#)  
 ‘burning bush’ story [here](#)  
 Bychkov, Alexander Vladimirovich [here](#), [here](#)  
 Bychkov, Vladimir Lvovich [here](#), [here](#)  
  
 Cade, Cecil Maxwell (1918–1984) [here](#), [here](#)  
 causal interpretation of quantum mechanics [here](#)  
 Cerrillo, Manuel V. [here](#)  
*Chaldaean Oracles* [here](#)  
 charged dust [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Cheng, Xianru [here](#)  
 Chetoui, Wilfried-René [here](#)  
 Chizhevsky, Alexander Leonidovich (aka Chizhevskii and Tshijevsky (1897–1964) [here](#)  
 Christianity [here](#)  
 Chu, Jun-Haw [here](#), [here](#)  
 Chwirut, Barbara [here](#)  
 Cicero, Marcus Tullius (106 BC – 43 BC) [here](#)  
 cloud condensation nuclei [here](#), [here](#)  
 coherence [here](#), [here](#), [here](#), [here](#), [here](#)  
 cold plasma [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 ‘Collisionless Dynamics and the Cosmic Web’ (Hahn) [here](#)  
 ‘Compact Dusty Clouds in a Cosmic Environment’ (Tsytovich, Ivlev, Burkert and Morfill) [here](#)  
 complex fluids [here](#)  
 complex plasmas [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 complex plasmoids [here](#)  
 conception flashes [here](#)  
 ‘Conjectures on Superconductivity and Cancer’ (Marton) [here](#)  
 consciousness [here](#)  
 Cook, Captain James (1728–1779) [here](#)  
 Cope, Freeman Widener [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Corben, Herbert Charles (1914–2000) [here](#), [here](#), [here](#)  
*Cosmic Dust* (Dauvillier) [here](#)  
*Cosmic Electrodynamics* (Piddington) [here](#)  
*Cosmic and Meta-Cosmic Theology in Aristotle’s Lost Dialogues* (Bos) [here](#)  
*Cosmic Plasma* (Alfvén) [here](#), [here](#)  
 Cosmic Web [here](#), [here](#), [here](#)



[illegible]

Eddington, Sir Arthur (1882–1944) [here](#), [here](#)  
 edges [here](#), [here](#), [here](#)  
 Egeland, Alv [here](#), [here](#)  
 Egypt, Ancient [here](#)  
 Einstein, Albert (1879–1955) [here](#), [here](#), [here](#), [here](#)  
 electric fields [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
*Electric Sky, The* (Scott) [here](#), [here](#)  
*Electric Universe, The* (Thornhill and Talbott) [here](#)  
 electric universe theory [here](#)  
 electrical aspects of human body [here](#)  
*Electrical Biology and Cancer* (Szent-Györgyi) [here](#), [here](#)  
*Electromagnetic Fields and Life* (Presman) [here](#), [here](#), [here](#)  
 electro-magnetic impacts [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 electro-microbiology [here](#)  
 emergence [here](#), [here](#), [here](#)  
 Enoch [here](#), [here](#)  
 entanglement, quantum [here](#), [here](#)  
 evolution and dusty complex plasma [here](#)  
 ‘Evolution of Voids in Dusty Plasmas’ (Tsytovich) [here](#)  
*Experientia* [here](#)  
 ‘Experimental Investigations of the Motion of Plasma Projected from a Button Source across Magnetic Fields’ (Bostick, Harris and Theus) [here](#)  
 ‘Experimental Study of Ionized Matter Projected across a Magnetic Field’ (Bostick) [here](#)  
 Explorer satellites [here](#), [here](#)  
*Extreme States of Matter on Earth and in the Cosmos* (Fortov) [here](#)

Falck-Ytter, Harald [here](#)  
 Falthammar, Carl-Gunne [here](#)  
 Fenwick, Elizabeth [here](#), [here](#)  
 Fenwick, Peter Brooke Cadogan [here](#), [here](#)  
 Ferraro, Vincenzo Consolato Antonio (1907–74) [here](#)  
 Ferrell, James Ellsworth [here](#)  
 Feynman, Richard (1918–1988) [here](#)  
 filamentary network [here](#)  
 filamentary structure of neural network, [here](#), [here](#)  
 filaments, bundled [here](#)  
 filaments for plasma [here](#), [here](#), [here](#), [here](#), [here](#)  
 filaments in electric universe [here](#), [here](#), [here](#)  
 filaments in solar system [here](#)  
 filaments, intergalactic [here](#), [here](#), [here](#)  
 filaments, spiralling [here](#)  
 filaments, superconducting [here](#), [here](#), [here](#), [here](#), [here](#)  
 formation of space dust [here](#)  
 Fortenbaugh, William W , [here](#)  
 Fortov, Vladimir Yevgeyevich (1946–200) [here](#)  
*Fourth State of Matter Plasma Dynamics and Tomorrow’s Technology, The* (Bova) [here](#)  
 fractality [here](#), [here](#)  
 fractals [here](#)

Frank-Kamenetsky, David Albertovich (1910–1970) [here](#), [here](#), [here](#)

Freud, Sigmund [here](#)

'From Mitogenetic Rays to Biophotons' (Belousov and Voerkov) [here](#)

*Function of the Orgasm, The* (Reich) [here](#)

*Fundamental Principles of Physics* (Bennett and Heil) [here](#)

Gahleo [here](#), [here](#)

Gassendi, Pierre (1592–1655) [here](#)

Geselowitz, David Beryl (1930–2020) [here](#)

Giles, Herbert Allen (1845–1935) [here](#)

Ginzberg, Vitaly Lazarevich (aka Ginzburg, 1916–2009) [here](#), [here](#)

Glanvill, Joseph (1636–1680) [here](#)

*Glimpses of Eternity* (Moody) [here](#)

Gnosticism [here](#), [here](#), [here](#)

Goertz, Christoph K. (murdered 1 November 1991 in the University of Iowa Physics Department massacre, aged 47) [here](#)

Gold, Thomas (1920–2004) [here](#), [here](#), [here](#), [here](#)

Goldfein, Solomon (1914–2003) [here](#)

Goldschmidt, Victor Moritz (1888–1947) [here](#)

Goosens, Marcel [here](#)

Gordon, Hamish [here](#), [here](#)

Goree, John Arlin [here](#)

grains, dust [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

Grischenko, V.S. [here](#), [here](#), [here](#)

Gurwitsch, Alexander Gavrilowitsch (aka Aleksandr Gavrilovich Gurvich. Gurvitch, 1874–1954) [here](#), [here](#), [here](#)

Gurwitsch, Lydia (aka Lydia Gurvich. Gurvitch; 1868–1951) [here](#)

Hahn, Oliver [here](#)

Hall, Edwin (1855–1938)

The Hall Effect [here](#), [here](#)

Hannay, John [here](#)

The Hannay Angle, [here](#)

Harris, E. G. [here](#), [here](#)

Hayashi, Yasuki [here](#), [here](#)

Heil, Herman [here](#)

helix [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

helium 3 [here](#)

Hengartner, Michael Otmar [here](#), [here](#)

Heraclitus the Grammarian (lived circa first century AD) [here](#)

Hiley, Basil [here](#), [here](#)

Hill, Jay [here](#), [here](#)

Hinduism [here](#)

hinges [here](#)

holonomic brain theory [here](#)

Homer (dates disputed, often thought to have flourished 750 BC) [here](#)

*Homeric Problems* (Heraclitus the Grammarian) [here](#)

Hout, R. B. [here](#)

Hoyle, Sir Fred (1915–2001) [here](#), [here](#), [here](#), [here](#), [here](#)

human bodies

and bacteria [here](#), [here](#)

and bioinformation [here](#)

and biophotons [here](#), [here](#)

and bioplasma [here](#), [here](#), [here](#), [here](#), [here](#)

and conception flashes [here](#)

and death flash [here](#)

and death signals [here](#)

and electrical aspects of [here](#)

electro-magnetic impact on [here](#), [here](#), [here](#), [here](#), [here](#)

and microbial clouds [here](#)

plasma in [here](#), [here](#)

and superconductivity [here](#)

Hundhausen, Arthur James [here](#)

I, Lin [here](#), [here](#)

*I Ching* (aka *Yi Jing*) [here](#)

ice [here](#), [here](#), [here](#), [here](#), [here](#)

icebergs [here](#)

ice variations [here](#), [here](#)

Ikezi, Hiroyuki [here](#), [here](#), [here](#)

*Iliad* (Homer) [here](#)

Implicate Order [here](#), [here](#), [here](#)

Information Theory [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

inorganic life forms [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

intelligence of plasma [here](#), [here](#), [here](#)

*Introduction to Complex Plasmas* (Bonitz) [here](#)

*Introduction to Dusty Plasma Physics* (Krishnan) [here](#)

*Introduction to Dusty Plasma Physics* (Shukla and Mamun) [here](#)

*Introduction to Plasma Astrophysics and Magnetohydrodynamics* An (Goossens) [here](#)

Inyushin, Viktor Mikhailovich [here](#) [here](#), [here](#)

ionosphere [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

ionosphere, destruction of [here](#)

Ishihara, Osama [here](#), [here](#), [here](#), [here](#), [here](#)

Ivlev, Alexey V. [here](#)

Jago, Lucy [here](#), [here](#)

Jesus Christ [here](#)

Jones, Harry (1905–1986) [here](#), [here](#)

Josephson, Brian [here](#), [here](#), [here](#), [here](#)

Josephson Junctions [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

*Journal of Geophysical Research* [here](#)

Judaism [here](#), [here](#)

Kapitsa, Peter (Pytor) Leonidovich (1894–1984) [here](#), [here](#), [here](#), [here](#)

Kaznatcheev, V্লাই Petrovich (1924–2014) [here](#), [here](#), [here](#)

Kelvin, Lord (1824–1907) and Kelvin Scale [here](#), [here](#), [here](#)

Kepler, Johannes (1571–1630) [here](#)

Kim, [here](#)

*King's Mirror The* [here](#)

Kirlian photography [here](#), [here](#)

Klarmann, Adolf Donald (1904–1975) [here](#)

Kobayashi, Masaki [here](#)

Kordylewski, Kazimierz (1902–1981) [here](#)

Kordylewski Clouds

ball lightning control [here](#)

composition of [here](#), [here](#), [here](#)

discovery of [here](#)

and energy from the Sun [here](#), [here](#), [here](#)

formation of life [here](#)

intelligence of [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

Josephson Junctions in [here](#), [here](#)

and magnetic monopoles [here](#)

plasma composition [here](#)

size of [here](#)

structure of [here](#), [here](#), [here](#)

and the Sun [here](#)

voids in [here](#), [here](#), [here](#)

Korotkov, Konstantin G. [here](#)

Kosovichev, Alexander G. [here](#)

Krishnan, Vinod [here](#)

Kulagina [here](#)

L4 [here](#), [here](#)

L5 [here](#), [here](#), [here](#), [here](#)

Lagrange Points [here](#)

Langhansen, Christoph (1691–1770) [here](#), [here](#)

Langmuir, Irving (1881–1957) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

*Language of Physics, The. A Foundation for University Study* (Cuillerme and Machacek) [here](#)

*Languages of the Brain* (Pribram) [here](#)

Laozi (aka Lao Tzu) [here](#), [here](#)

Laubscher, Bernard Jacob Frederick (1898–1984) [here](#), [here](#)

*L'Aurore Boréale Étude Générale des Phénomènes Produits par les Courants Électriques de l'Atmosphère* (Lemström) [here](#)

Lawrence, Ernest Orlando (1901–1958) [here](#)

Lebor, Adam [here](#)

Lee, Matt [here](#)

Leem, Knud [here](#), [here](#)

Lehmann, Rosamond (1901–1990) [here](#)

Lemström, Karl Selim (1838–1904) [here](#), [here](#), [here](#), [here](#)

lepton [here](#)

libido energy [here](#)

Liezi (aka Lieh Tzu) [here](#)

*Life of Lysander, The* (Plutarch) [here](#)

light cavities [here](#)



Little, William A. [here](#), [here](#), [here](#)  
*Living State, The With Observations on Cancer* (Szent-Györgyi) [here](#)  
 Lloyd, Seth [here](#)  
 Lochak, Georges (1930–2021) [here](#), [here](#)  
 long-range order [here](#), [here](#)  
 Ludwig, George [here](#)  
 Lysenko, Trofim Denisovich (1898–1976) [here](#)  
 Lytleton, Ray (1911–1995) [here](#)  
  
 MacDougall, Duncan (1866–1920) [here](#), [here](#)  
 Machacek, Anton [here](#)  
 Machacek, Cullerne [here](#), [here](#)  
 Magdalene, Mary [here](#)  
 magnetic lines of force, field lines [here](#), [here](#)  
 magnetic monopoles [here](#), [here](#), [here](#)  
 magnetosphere [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Mahler, Günter [here](#), [here](#)  
 Mamun, Abdullah al [here](#)  
 Mandelbrot, Benoit (1924–2010) [here](#)  
 Manichaeism [here](#)  
 Mann, W. Edward [here](#)  
 Marino, Andrew Anthony [here](#), [here](#)  
 Marklund, Göran T. [here](#)  
 Marklund Convection [here](#)  
*Marsanes* [here](#), [here](#)  
 Marton, J.P. [here](#), [here](#)  
*Mass Psychology of Fascism, The* (Reich) [here](#)  
 Maurois, André (1885–1967) [here](#), [here](#)  
 Maxwell-Heaviside Equations [here](#)  
 McFee, Richard [here](#), [here](#), [here](#), [here](#), [here](#)  
 McIlwain, Carl [here](#)  
 McKittick, Thomas Harrington (1889–1970) [here](#), [here](#)  
 McMorrow, Des [here](#)  
 Mead, George Robert Stow (1863–1933) [here](#)  
 Meadow, James F. [here](#)  
 Melzer, André [here](#), [here](#)  
 Mendis, Devamitta Asoka (1936–) [here](#), [here](#)  
 Metatron [here](#)  
*Meteorology* (Aristotle) [here](#)  
 microbial clouds [here](#), [here](#), [here](#), [here](#)  
 Milani, Marziale [here](#), [here](#)  
 military applications of ball lightning [here](#)  
*Mind, Matter and the Implicate Order* (Pylkkänen) [here](#)  
 mist [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Mitatrush [here](#)  
 Mitchell, Peter (1920–1992) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
*Mitogenetic Rays, The* (Gurwitsch and Gurwitsch) [here](#)  
 Molina, Juan Ignacio (1740–1829) [here](#)

Monopoles, magnetic [here](#), [here](#), [here](#)  
Moody, Raymond [here](#), [here](#)  
Morfill, Gregor Eugen [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
Moses [here](#), [here](#), [here](#)

Nag Hammadi texts [here](#), [here](#), [here](#), [here](#)  
Nardi, Vito [here](#)  
*Natural History* (Pliny) [here](#)  
*Natural Questions* (Seneca) [here](#)  
*Nature* (magazine) [here](#), [here](#), [here](#), [here](#), [here](#)  
*Nature of Ball Lightning The* (Singer) [here](#)  
Needham, Joseph (1900–1993) [here](#), [here](#), [here](#), [here](#), [here](#)  
Ness, Norman Frederick [here](#)  
*Netherworld* (Temple) [here](#)  
neural network, [here](#), [here](#), [here](#)  
neutrinos [here](#), [here](#)  
*New Scientist* [here](#)  
Newton, Isaac [here](#)  
Nishida, Atsuhiko [here](#)  
nodes, antinodes [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
non-locality [here](#)  
Nordenskiöld, Adolf Erik (1832–1901) [here](#) [here](#)  
Northern Lights *see* [Aurora Borealis](#)  
*Northern Lights, The* (Jago) [here](#), [here](#)

odic force [here](#), [here](#)  
*Odyssey* (Homer) [here](#)  
Ohm, Georg (1789–1854) [here](#)  
Ohtsuki, Yoshi-Hiko [here](#), [here](#)  
‘On Electrical Attraction and Repulsion, and Their Relation to Chemical Changes’ (Davy) [here](#)  
‘On a Fourth State of Matter’ (Crookes) [here](#)  
‘On the Importance of Electric Fields in the Magnetosphere and Interplanetary Space’ (Alfvén) [here](#)  
Onnes, Heike Kamerlingh (1853–1926) [here](#)  
Oppenheimer, Robert (1904–1967) [here](#)  
*Oracles of the Dead* (Temple) [here](#)  
orgasms [here](#)  
orgone energy [here](#), [here](#), [here](#)  
‘Oscillations in Ionized Gases’ (Langmuir) [here](#)  
Ostrander, Sheila [here](#), [here](#)  
Ott, Torben [here](#), [here](#)

*Paraphrase of Shem, The* [here](#), [here](#)  
Parker, Eugene Newman (1927–) [here](#), [here](#)  
Paulsen, Adam Frederik Wivet (1833–1907) [here](#), [here](#), [here](#), [here](#)  
Peratt, Anthony L. [here](#), [here](#)  
phase transition [here](#)  
Philoponus, John (AD c. 490 – c. 570) [here](#), [here](#)  
physical matter [here](#), [here](#), [here](#)

*Physical Review* [here](#), [here](#), [here](#)

*Physical Review Letters* [here](#)

*Physics of High Pressure, The* (Bridgman) [here](#), [here](#)

*Physics of the Plasma Universe* (Peratt) [here](#), [here](#)

*Physiological Chemistry and Physics* [here](#)

Piddington, John Hobart 'Jack' (1910–97) [here](#)

Piel, Alexander [here](#)

Pines, David (1924–2018) [here](#), [here](#)

Pioneer III satellite [here](#)

*Pistis Sophia* [here](#), [here](#)

plasma

ancient attitudes to [here](#)

and Ancient Egypt [here](#)

and Aristotle [here](#)

and bioplasma [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

and Christianity [here](#)

composition of [here](#)

and creation of life [here](#)

and Daoism [here](#)

description of [here](#)

discovery of [here](#)

double layers in [here](#)

dusty complex plasma [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

formation of space dust [here](#)

and Gnosticism [here](#), [here](#), [here](#)

and Hinduism [here](#)

in human bodies [here](#), [here](#)

intelligence of [here](#), [here](#), [here](#)

and Judaism [here](#), [here](#)

and Kordylewski Clouds [here](#)

and life forms [here](#)

as living entity [here](#), [here](#)

as main constituent of Universe [here](#), [here](#), [here](#), [here](#), [here](#)

and microbial clouds [here](#), [here](#)

and physical matter [here](#), [here](#)

research into [here](#), [here](#), [here](#)

temperature variations of [here](#), [here](#)

and Van Allen Radiation Belts [here](#)

visibility of [here](#)

voids in [here](#), [here](#)

plasma bodies [here](#), [here](#), [here](#)

plasma cells [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

plasma crystals [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

and ball lightning [here](#), [here](#)

creation of [here](#)

structure of [here](#)

'Plasma Flow from the Sun' (Hundhausen) [here](#)

*Plasma. The Fourth State of Matter* (Frank-Kamenetsky) [here](#)



*Plasma Physics* (Piel) [here](#)  
*Plasma Universe, The* (Supplee) [here](#)  
*Plasmus The First State of Matter* (Krishnan) [here](#)  
 plasmoids [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 'Plasmoids' (Bostick) [here](#)  
 Plato [here](#)  
 Pliny (AD [here](#)) [here](#)  
 Plutarch (AD c. [here](#) [here](#), [here](#), [here](#))  
 Popp, Fritz-Albert (1938–2018) [here](#), [here](#), [here](#), [here](#)  
 'Possible Superconductivity at Room Temperature' (Antonowicz) [here](#)  
 'Possibility of Synthesizing an Organic Superconductor' (Little) [here](#)  
*pneuma* [here](#), [here](#), [here](#), [here](#)  
*Pneumatica* (Hero), [here](#)  
 Gopalraja, Praburam (aka Prabu Raja) [here](#)  
 Presman, Aleksandr Samuilovich (1909–1985) [here](#), [here](#), [here](#)  
 Pribram, Karl H (1919–2015) [here](#), [here](#)  
 Prigogine, Ilya Romanovich (1917–2003) [here](#), [here](#), [here](#)  
*Principia Mathematica* (Newton) [here](#)  
*Principles of Development* (Weiss) [here](#)  
 programmed cell death [here](#)  
 Project Argus [here](#)  
 proticity [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Ptah, [here](#)  
 Pu Songlin [surname given first; 1640–1715] [here](#)  
 Pughsi, V [here](#), [here](#)  
 Purce, Jill [here](#)  
 Pylkkänen, Paavo [here](#), [here](#), [here](#)  
  
 quantum computing [here](#), [here](#), [here](#), [here](#)  
 quantum entanglement [here](#), [here](#)  
 quantum mechanics [here](#), [here](#)  
*Quantum Processes Systems and Information* (Schumacher and Westmoreland) [here](#)  
 Qubits [here](#)  
 Qudits [here](#)  
  
 'Radiation Observations with Satellite 1958e' (Van Allen) [here](#)  
 rain, positively charged and negatively charged [here](#)  
 Ray, Ernie [here](#)  
 Raytheon Corporation [here](#)  
 Reich, Wilhelm (1897–1957) [here](#), [here](#), [here](#), [here](#)  
 Reichenbach, Karl von (1788–1869) [here](#), [here](#), [here](#)  
*Researches on Magnetism, Electricity, Heat, Light* (von Reichenbach) [here](#)  
 Rejdák, Zdenek [here](#)  
 Richmann, Georg Wilhelm (1711–1753) [here](#)  
 Rahn, Otto (1904–1939) [here](#)  
 Rossler Attractor [here](#)  
 Rössler, Otto [here](#)  
 Rothen, Alexandre (1900–1987) [here](#), [here](#), [here](#)

Rowland, Henry Augustus (1848–1901) [here](#)  
Royal Society [here](#)

Sagan, Paul [here](#), [here](#)

Samsonov, Dmitry Valerievich (aka Dmitri, died 2012) [here](#)

Saturn [here](#), [here](#), [here](#), [here](#)

Schacht, Hjalmar (1877–1970) [here](#)

Scherrer, Philip H [here](#)

Scholem, Gershom (1897–1982) [here](#), [here](#)

Schou, Jesper [here](#)

Schroeder, Lynn [here](#), [here](#)

Schumacher, Benjamin [here](#), [here](#)

*Science* (magazine) [here](#)

*Science Delusion, The* (Sheldrake) [here](#)

*Scientific American* [here](#)

*Scientific Uses of Earth Satellites* (Van Allen) [here](#)

Scott, Donald Edward [here](#), [here](#), [here](#)

Sedlak, Włodzimierz (1911–1993) [here](#)

self-organisation [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

self-similarity [here](#)

Selwyn, Gary Stewart [here](#), [here](#)

Semiconductors [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

Seneca, Lucius Annaeus (4 BC–AD 65) [here](#) [here](#)

*senek* [here](#)

Shannon, Claude Elwood (1916–2001) [here](#)

sheaths [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

Sheldrake, Rupert [here](#)

Shukla, Padma Kant (1950–2013) [here](#), [here](#), [here](#), [here](#)

Simplicius (AD 490–560) [here](#)

Singer, Stanley (1926–2008) [here](#), [here](#), [here](#)

singular regions, singularities, singular [here](#), [here](#)

Sławinski, Janusz (1936–2016) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

Sloan Great Wall [here](#)

Smith, Cyril William (1930–?) [here](#)

soft matter [here](#), [here](#)

solar winds [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

solitons [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)

*Solitons in Molecular Bioenergetics* (Davydov) [here](#)

*Solitons in Molecular Systems* (Davydov) [here](#)

Solomon, Jonathan [here](#)

Solymar, László (1930–?) [here](#)

soul, weight of [here](#)

space dust

amount of [here](#)

and creation of life [here](#)

description of [here](#)

dusty complex plasma [here](#), [here](#), [here](#), [here](#), [here](#)

formation of [here](#)

and formation of stars [here](#)  
 net zero charge [here](#)  
 as self-organised systems [here](#)  
 voids in [here](#)  
 spinning grains [here](#), [here](#), [here](#), [here](#)  
 spinning plasmoid [here](#)  
 spiral [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 spiralling [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Spitzer, Lyman (1914–1997) [here](#), [here](#), [here](#), [here](#)  
 standing wave [here](#), [here](#), [here](#), [here](#)  
 Stenhoff, Mark [here](#), [here](#)  
 Stewart, Balfour (1828–1887) [here](#), [here](#)  
 Stolzenburg, Dominik [here](#)  
 Strato of Lampsacus (c. 335 BC – c. 269 BC), [here](#)  
 Stumpf, Harald [here](#)  
 subtle body [here](#), [here](#)  
 Sun, The  
     coldness of [here](#)  
     and electric universe theory [here](#)  
     and Kordylewski Clouds [here](#)  
     and neutrinos [here](#)  
     and solar wind [here](#), [here](#)  
     and sunspots [here](#)  
 superconductivity [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 superfluidity [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Supplee, Curt [here](#)  
*Sur les Aurores Boréales* (Nordenskiöld) [here](#)  
 Swann, Ingo Douglas (1933–2013) [here](#)  
 Szent-Györgyi, Albert (1893–1986) [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
  
 Tachibana, K. [here](#), [here](#)  
 tachyons [here](#), [here](#), [here](#)  
 Takada, M [here](#)  
 Talbot, David [here](#), [here](#)  
 Talbott, David [here](#)  
*Taming of the Thunderbolts, The The Science and Superstition of Ball Lightning* (Maxwell Cade and Davis) [here](#)  
 Teich, Werner G [here](#)  
 Teller, Edward (1908–2003) [here](#)  
 temperature variations of plasma [here](#), [here](#)  
 Temple, Olivia [here](#), [here](#)  
 Temple, Robert [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
 Tesla, Nikola (1856–1943) [here](#), [here](#)  
 Theophrastus of Eresus (Eresos on Lesbos) (c. 371 BC – 287 BC) [here](#), [here](#)  
 Theus, R B [here](#)  
 Thomas, Hubertus Maria [here](#), [here](#), [here](#)  
 Thornhill, Wallace [here](#)  
 thunderbolts [here](#), [here](#)

*Time* (magazine) [here](#)  
topological physics [here](#)  
topological superfluid [here](#), [here](#)  
'Traffic Signals That Wire the Brain' (Lee) [here](#)  
*Traité Physique et Historique de l'Aurore Boreale* (De Mairan) [here](#)  
transhumanism [here](#)  
trapped light [here](#)  
Troland, Leonard Thompson (1899–1932) [here](#)  
Tromholt, Sophus (1852–1896) [here](#), [here](#)  
Tsyтовich, Vadim Nikolaevich (1929–2015) [here](#), [here](#), [here](#), [here](#), [here](#)  
tunnelling [here](#), [here](#)  
turbulence, atmospheric, not affecting ball lightning [here](#)

*Under the Rays of the Aurora Borealis* (Tromholt) [here](#)

vacuum tube [here](#)  
Van Allen, James (1914–2006) [here](#), [here](#), [here](#)  
Van Allen Radiation Belts [here](#), [here](#), [here](#)  
van Wijk, Eduard Pieter [here](#)  
van Wijk, Roeland ('Roel') [here](#), [here](#), [here](#)  
vectorial metabolism [here](#), [here](#)  
*Vedas, The* [here](#)  
Vitiello, Giuseppe [here](#)  
Vladimirov, Sergey [here](#), [here](#)  
Vorikov, Vladimir [here](#)  
voids [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
void, informational [here](#)  
void lattices [here](#), [here](#), [here](#)  
voids, nano [here](#)  
voids, organic [here](#)  
Völgyesi, Ferenc [here](#)  
Volodyaev, Ilya [here](#)  
von Reichenbach, Karl *see* [Reichenbach](#)  
vortex, vortices [here](#), [here](#), [here](#), [here](#), [here](#)  
Voyager 2 satellite [here](#), [here](#), [here](#)  
*vril* [here](#)

Wagner, Robert [here](#)  
Walsh, Donald [here](#)  
water structures [here](#)  
*Weigher of Souls, The* (Maurois) [here](#), [here](#)  
Weiss, Paul Alfred (1898–1989) [here](#)  
Werfel, Franz (1890–1945) [here](#), [here](#)  
Westmoreland, Michael [here](#), [here](#)  
Whittet, Douglas [here](#)  
Wickramasinghe, Chandra [here](#), [here](#), [here](#), [here](#), [here](#), [here](#), [here](#)  
Wigner, Eugene Paul (1902–1995) [here](#)  
Willems, Jan Camiel (1939–2013) [here](#)

Williams, Robert Joseph Paton (1926–2015) [here](#), [here](#)

Williamson, Christina J. [here](#)

Winkler, Paul M. [here](#)

Wolff, SS General Karl [here](#)

Yahoel [here](#)

Yol [here](#)

Yukawa, Hideki (1907–1981) [here](#)

Yukawa Balls [here](#)

Z-pinches [here](#)

Zeus, [here](#)

Zhang Changlin [here](#), [here](#)

Zucker, Oved [here](#)

Zurek, Wojciech Hubert [here](#), [here](#)

Zwicky, Fritz (1898–1974) [here](#), [here](#)

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THE HISTORY OF SCIENCE  
3000 YEARS OF DISCOVERY  
AND INVENTION

Edited by  
JAMES H. CAMPBELL

A large, dark, circular object, possibly a globe or a large wheel, with a textured surface, set against a background of a city skyline at night. The object is positioned in the foreground, partially obscuring the view of the city. The city lights are visible in the background, creating a bokeh effect. The overall scene is dark and atmospheric.





# CONTENTS





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E  
D  
I  
C  
A  
T  
I  
O  
N

TO DR SONG HAN,  
WITH DEEP GRATITUDE FOR  
HIS FRIENDSHIP, HIS QUALITIES  
OF CHARACTER, INTELLECTUAL  
BRILLIANCE, AND PRACTICAL GRASP  
OF PUBLIC AFFAIRS, HAVE MADE  
HIM ONE OF THE MOST LOVED  
AND ADMIRER OF ALL THE  
LEADERS OF CHINA.

# PREFACE

Dr Joseph Needham, Fellow of the Royal Society in Britain, a famous biochemist and historian of science and an old friend of the Chinese people, devoted his later life to the study of the history of Chinese science and technology and to encouraging friendship between the British and Chinese people. From the middle of the last century, Dr Needham gave his full strength to doing a conscientious job of classifying and researching the rich ancient Chinese traditions of science and technology, and he achieved great success. *Science and Civilization in China*, which is about 20 million words in length, is an unprecedented contribution to the world history of science and technology. With the correct views and thoughtful insights of a Western scholar, he came to a systematic and comprehensive conclusion about the glorious achievements of ancient Chinese science and technology through this series of works. His works fully affirm the great contribution of ancient Chinese civilization to world civilization, and erect a bridge of mutual communication and understanding between the two major Eastern and Western systems. His work has exerted tremendous and profound influence in respect of enhancing the comprehensive understanding of China by other countries, facilitating the scientific and cultural exchange between East and West, and promoting research into Chinese science and technology.

Robert Temple is a British scholar who loves the Chinese people and has a deep interest in and admiration for traditional Chinese culture and scientific achievements. Through comparative study, he came to a surprising conclusion. Possibly more than half of the basic inventions and discoveries upon which the 'modern world' rests come from China. Therefore, he came to the profound realization that civilization is an inseparable entirety and that the modern technological world is a joint creation of Eastern and Western civilisations, and that both East and West should acknowledge and respect China's contribution. In order to acquaint western readers with a general knowledge of ancient Chinese science and technology, he wrote his book *The Genius of China* (the Chinese edition is called *The Spirit of Chinese Invention: 100 World Firsts*). It selected a hundred World First cases either chronologically or according to scientific criteria from the rich and varied Chinese scientific traditions and made a

concrete and concise introduction with pictures. Most of the materials are from Dr Needham's *Science and Civilization in China*, other works of Joseph Needham, and other unpublished typescripts and materials. Temple's work was praised by Dr Needham, who therefore wrote a warm Foreword for it.

*The Genius of China* is a book with rich content, clear expression and excellence both in pictures and text. It is scientific, knowledgeable and interesting, which is highly suitable for young people. Our new century is an era of the knowledge-based economy. The intense competition between nations is, to be exact, a competition for national quality. Our core target of deepening educational reform and advancing quality education in an all-round way is speedily cultivating the highly-qualified personnel who possess an innovative spirit and can demonstrate capability. General Secretary Jiang Zemin has stressed repeatedly that 'innovation is the spirit of a nation and the endless momentum for a nation's prosperity'. He has also said 'The Chinese nation should occupy its proper place in the field of world high-technology'. Our young people are expected to bear firmly in mind General Secretary Jiang's instructions, undertake the mission of the times, always regard the building of the state's prosperity and the people's happiness as their duty. They should be determined to have the lofty aspirations of loving their homeland and going all out from childhood to make their country strong, to be the 'New People' (having ideas, morality, knowledge and discipline) and dedicate their wisdom and capability to their country, and to help to realize the great rejuvenation of the Chinese nation. Reading this book, young people could not only acquire a relatively clear understanding of the splendid history of science and technology of their motherland, but also draw stimulation in the course of studying and carrying on the long-standing and well-established innovative spirit and courage of the Chinese nation. Therefore *The Genius of China*, written by the friend of China, Robert Temple, is a good teaching material with a unique perspective to assist in quality education for young Chinese people.

MADAME CHEN ZHILI

State Councillor of China for  
Education, Science, Technology and Culture



Alte VE. The painting is a reproduction of the original painting of a galloping horse. The artist's name and date, 1635, are visible in the upper left corner. The painting is a reproduction of the original painting of a galloping horse. The artist's name and date, 1635, are visible in the upper left corner. The painting is a reproduction of the original painting of a galloping horse. The artist's name and date, 1635, are visible in the upper left corner.

# FOREWORD

I should like to give a warm welcome to this book by Robert Tempie. It is, in its own way, a brilliant distillation of my *Science and Civilisation in China*, published by the Cambridge University Press, a work which will be complete in some twenty-five volumes and of which fifteen have now appeared or are passing through the press.

The extraordinary inventiveness, and insight into nature, of ancient and medieval China raises two fundamental questions. First, why should they have been so far in advance of other civilizations, and second, why aren't they now centuries ahead of the rest of the world? We think it was a matter of the very different social and economic systems between China and the West, as I will explain more fully in a moment. Modern science arose only in Europe in the seventeenth century when the best method of discovery was itself discovered, but the discoveries and inventions made then and thereafter depended in so many cases on centuries of previous Chinese progress in science, technology and medicine.

Perhaps I should describe how I became involved in all this. Coming to Cambridge in 1918, intending to read medicine, I was trained primarily as a biochemist, and specialized in the connections of biochemistry with embryology, producing *Chemical Embryology* in 1931, and *Biochemistry and Morphogenesis* in 1942. But I was always interested in the history of science, and in a way Charles Singer did as much for me as Frederick Gowland Hopkins. My *History of Embryology* came out in 1934.

Three years later the laboratories in which I worked received several Chinese scientists, some intending to do research leading to the doctorate. We became great friends, and this had two effects upon me. First, I found that the better I got to know them the more exactly like my own their minds were, which raised in acute form the question of why modern science had begun only in Europe. Second, I learnt the Chinese language, and I did so as a labour of love, which is quite a different thing from going through the mill of the Oriental Studies Tripos. By the time that one of them, now long my chief collaborator, Lu Gwei-Djen left in 1940, we had decided that something absolutely must be done about the history of science, technology and medicine in traditional Chinese culture.

Then in 1942 I was asked to go to China, as an envoy from the Royal Society, and this led to my staying there for the duration of the Second World War as Scientific Counsellor at the British Embassy in Chungking. Since the post involved a great deal of traveling, I had ample opportunities for learning about what had happened in Chinese history; wherever I went there was usually someone, a medical doctor, a mathematician or an engineer, who was deeply interested in how the subject had developed in his own culture, and was able to tell me what to read, what books to buy if possible, and so on. Thus I gained a remarkable orientation, which perhaps could hardly have been achieved in any other way. After the war was over I put in two years helping to build up Unesco by organizing the Division of Natural Sciences.

When I returned to Cambridge in 1948 the project of *Science and Civilisation in China* began in earnest, with the help of my first collaborator Wang Ching-Ning. Although I was still Sir William Dunn Reader in Biochemistry, and therefore had a good many lectures to give to the advanced students, we made good progress, and the first volume of the series came out in 1954. Looking back at it now, I feel that in a task of this sort it is very important not to know too much, but yet to be in possession of a boundless enthusiasm for the Chinese people and their achievements over the ages. Now some fifteen volumes have been published, and the whole set is expected to consist of at least twenty-five, so we have come a long way since we started.

And gradually what a cave of glittering treasures was opened up! My friends among the older generation of sinologists had thought that we should find nothing – but how wrong they were. One after another, extraordinary inventions and discoveries clearly appeared in Chinese literature, archaeological evidence or pictorial witness, often, indeed generally, long preceding the parallel, or adopted, inventions and discoveries of Europe. Whether it was the array of binomial coefficients, or the standard method in interconversion of rotary and longitudinal motion, or the first of all clockwork escapements, or the ploughshare of malleable cast iron, or the beginnings of geobotany and soil science, or cutaneous-visceral reflexes, or the finding of smallpox inoculation wherever one looked there was 'first' after 'first'.



Francis Bacon had selected three inventions, paper and printing, gunpowder, and the magnetic compass, which had done more, he thought, than any religious conviction, or any astrological influence, or any conqueror's achievements, to transform completely the modern world and mark it off from antiquity and the Middle Ages. He regarded the origins of these inventions as 'obscure and inglorious' and he died without ever knowing that all of them were Chinese. We have done our best to put this record straight.

Chauvinistic Westerners, of course, always try to minimize the indebtedness of Europe to China in antiquity and the Middle Ages, but often the circumstantial evidence is compelling. For example, the first blast furnaces for cast iron, now known to be Scandinavian of the late eighth century AD, are of closely similar form to those of the previous century in China, while as late as the seventeenth century AD the magnetic compasses of surveyors and astronomers pointed south, not north, just as the compasses of China had always done. In many cases, however, we cannot as yet detect the capillary channels through which knowledge was conveyed from East to West. Nevertheless we have always adopted the very reasonable assumption that the longer the time elapsing between the appearance of a discovery or invention in one part of the world, and its appearance later on in some other part of the world far away, the less likely is it that the new thing was independently invented or discovered.

But all these things being agreed, a formidable question then presents itself. If the Chinese were so advanced in antiquity and the Middle Ages, how was it that the Scientific Revolution, the coming of *modern* science into the world, happened only in Europe? This is what we call the 'sixty-four thousand dollar question', and it may be remembered that it was precisely this problem which presented itself to me so forcefully when I first met the Chinese scientists who came to Cambridge in 1937. The fact is that in the seventeenth century we have to face a package deal; the Scientific Revolution was accompanied both by the Protestant Reformation and by the rise of capitalism, the ascendancy of the entrepreneurial bourgeoisie. Discontinuously *modern* science, which then developed, was a mathematization of hypotheses about nature, combined with relentless experimentation. The sciences of all the ancient and medieval worlds had had an indeleibly ethnic stamp, but now nature was addressed for the first time in a universal and international language, the precise and quantitative idiom of mathematics, a tongue which every man and

woman, irrespective of colour, creed or race, can use and master if given the proper training. And to the technique of experiment the same applies. It was like the merchant's universal standard of value. How one looks at the primary causative factor in all this depends on one's own background, if one is a theologian one probably thinks that the liberation of the Reformation was responsible, if one is an old-fashioned scientist, one naturally thinks that the scientific movement occurred first and powered all the others, and if one is a Marxist, one certainly thinks that the economic and social changes bear the main responsibility.

One factor which must have great relevance here is the undeniable circumstance that the feudalism of Europe and China were fundamentally different. European feudalism was military-aristocratic: the peasantry were governed by the knights in their manors, and they in turn were subject to the barons in their castles, while the king in his palace ruled over all. In time of war he needed the help of the lower ranks in the feudal hierarchy who were bound to rally to him with stated numbers of men-at-arms. How different was the feudalism of China, long very justifiably described as bureaucratic. From the time of the first emperor Ch'in Shih Huang Ti, onwards (third century BC), the old hereditary feudal houses were gradually attacked and destroyed, while the king or emperor (as he soon became) governed by the aid of an enormous bureaucracy, a civil service unimaginable in extent and degree of organization to the petty kingdoms of Europe. Modern research is showing that the bureaucratic organization of China in its earlier stages strongly helped science to grow, only in its later ones did it forcibly inhibit further growth, and in particular prevented a break-through which has occurred in Europe. For example, no other country in the world at the beginning of the eighth century AD could have set up a meridian arc survey stretching from south to north some 2500 miles. Nor could it have mounted an expedition at that time to go and observe the stars of the southern hemisphere to within 20° of the south celestial pole. Nor indeed would it have wanted to.

It may well be that a similar pattern will appear in the future when the history of science, technology and medicine, for all the great classical literary cultures, such as India or Sri Lanka, comes to be written and gathered in. Europe has entered into their inheritance, producing an ecumenical universal science and technology valid for every man and woman on the face of the earth. One can only hope

that the shortcomings of the distinctively European traditions in other matters will not debauch the non-European civilizations. For example, the sciences of China and of Islam never dreamed of divorcing science from ethics, but when at the Scientific Revolution the final cause of Aristotle was done away with, and ethics chased out of science, things became very different, and more menacing. This was good in so far as it clarified and discriminated between the great forms of human experience, but very bad and dangerous when it opened the way for evil men to use the great discoveries of modern science and activities disastrous for humanity. Science needs to be

lived alongside religion, philosophy, history and esthetic experience, alone it can lead to great harm. All we can do today is to hope and pray that the unbelievably dangerous powers of atomic weapons, which have been put into the hands of human beings by the development of modern science, will remain under control by responsible men, and that maniacs will not release upon mankind powers that could extinguish not only mankind, but all life on earth.

JOSEPH NEEDHAM

## THE WEST'S DEBT TO CHINA

One of the greatest untold secrets of history is that the 'modern world' in which we live is a unique synthesis of Chinese and Western ingredients. Possibly more than half of the basic inventions and discoveries upon which the 'modern world' rests come from China. And yet few people know this. Why?

The Chinese themselves are as ignorant of this fact as Westerners. From the seventeenth century, the Chinese became increasingly dazzled by European technological expertise, having experienced a period of amnesia regarding their own achievements. When the Chinese were shown a mechanical clock by Jesuit missionaries, they were awestruck, forgetting that it was they who had invented mechanical clocks in the first place!

It is just as much a surprise for the Chinese as for Westerners to realize that *modern* agriculture, *modern* shipping, the *modern* oil industry, *modern* astronomical observatories, *modern* music, decimal mathematics, paper money, umbrellas, fishing reels, wheelbarrows, multi-stage rockets, guns, underwater mines, poison gas, parachutes, hot-air balloons, manned flight, brandy, whisky, the game of chess, printing, and even the essential design of the steam engine, all came from China.

Without the importation from China of nautical and navigational improvements such as ships' rudders, the compass and multiple masts, the great European Voyages of Discovery could never have been undertaken. Columbus would not have sailed to America, and Europeans would never have established colonial empires.

Without the importation from China of the stirrup, to enable them to stay on horseback, knights of old would

never have ridden in their shining armour to aid damsels in distress, there would have been no Age of Chivalry. And without the importation from China of guns and gunpowder, the knights would not have been knocked from their horses by bullets which pierced the armour, bringing the Age of Chivalry to an end.

Without the importation from China of paper and printing, Europe would have continued for much longer to copy books by hand. Literacy would not have become so widespread. Johannes Gutenberg did *not* invent movable type. It was invented in China. William Harvey did *not* discover the circulation of the blood in the body. It was discovered—or rather, always assumed—in China. Isaac Newton was *not* the first to discover his First Law of Motion. It was discovered in China.

These myths and many others are shattered by our discovery of the true Chinese origins of many of the things all around us, which we take for granted. Some of our greatest achievements turn out to have been not achievements at all, but simple borrowings. Yet there is no reason for us to feel inferior or downcast at the realization that much of the genius of mankind's advance was Chinese rather than European. For it is exciting to realize that the East and the West are not as far apart in spirit or in fact as most of us have been led, by appearances, to believe, and that the East and the West are *already combined* in a synthesis so powerful and so profound that it is all-pervading. Within this synthesis we live our daily lives, and from it there is no escape. The modern world is a combination of Eastern and Western ingredients which are inextricably fused. The fact that we are largely unaware

of it is perhaps one of the greatest cases of historical blindness in the existence of the human race

Why are we ignorant of this gigantic, obvious truth? The main reason is surely that the Chinese themselves lost sight of it. If the very originators of the inventions and discoveries no longer claim them, and their memory of them has faded, why should their inheritors trouble to resurrect their lost claims? Until our own time, it is questionable whether many Westerners even wanted to know the truth. It is always more satisfying to the ego to think that we have reached our present position alone and unaided, that we are the masters of all abstruses and crafts.

The discovery of the truth is a result of incidents in the life of the distinguished scholar Dr Joseph Needham, author of the great work *Science and Civilization in China*. In 1937, aged 37, Needham was one of the youngest Fellows of the Royal Society and a biochemist of considerable distinction at Cambridge. He had already published many books, including the definitive history of embryology. One day he met and befriended some Chinese students, including a young lady from Nanking named Lu Gwei-Djen, whose father had passed on to her his unusually profound knowledge of the history of Chinese science. Needham began to hear tales of how the Chinese had been the true discoverers of this and that important thing, and at first he could not believe it. But as he looked further into it, evidence began to come to light from Chinese texts, hastily translated by his new friends.

Needham became obsessed with the subject. Not knowing a word of Chinese, he set about learning the language. In 1942 he was sent to China as Scientific Counsellor to the British Embassy in Chungking. He was able to travel over China, learn the language thoroughly, meet men of science, and accumulate vast quantities of priceless ancient Chinese science books. These were flown back to Britain by the Royal Air Force and today form the basis of the finest library, outside China, on the history of Chinese science, technology and medicine, at the Needham Research Institute in Cambridge. After the War, Needham was among those who 'put the S into Unesco', having persuaded that organization to concern itself with science as well as education and culture. He became Unesco's first Assistant Director General for the natural sciences.

In July 1946 Needham stated in a lecture to the China Society in London that 'What is really very badly needed is a proper book on the history of science and technology in China, especially with reference to the social and economic background of Chinese life. Such a book would be by no means academic, but would have a wide bearing on the general history of thought and ideas.'

When he returned to Cambridge, where he eventually became Master of Caius College for many years, Joseph went ahead and wrote the work which he had envisaged, except that it was very academic and impenetrable to the ordinary educated reader. The result, *Science and Civilization in China*, became a huge multi-volume project, envisaged eventually in 36 volumes (at least 24 are now available). Since Joseph's death, further volumes in the series have been issued by a number of specialist collaborators. This was a process which had begun even while Joseph was alive, with the appearance of the excellent volume on agriculture, written by a then young, intrepid sinologist, Francesca Bray, under Joseph's occasional supervision.

Gwei-Djen died tragically before Joseph, leaving him emotionally bereft, but he continued working right up to his death. One day when Gwei-Djen was still alive, I pointed to an ornate sealed gate at Caius and said to Joseph, 'What is that, and why is it so tightly shut?' He said, 'That gate is only opened at the inauguration of a new Master, or when one dies, for his funeral. One day they'll carry out me through there. When, years later, I passed through the gate behind his coffin, I sadly recalled his comment.'

Joseph never lost his early vision of a work which was 'by no means academic' as he had originally promised. He had always wanted to make his work accessible in every possible way. Therefore, when I approached him in 1984 with the suggestion that I write a popular book for the general reader based upon his half-century's labour, he agreed more readily than at that time I could understand. He and Gwei-Djen told me that they strongly approved of some things I had published about the Shang Dynasty, the I Ching and such matters, and liked the way I wrote about such abstruse subjects for the ordinary reader without sacrificing scholarly accuracy.

Although Joseph did not personally like Professor Derk Bodde, under whom I had studied Chinese philosophy, my academic background was considered acceptable because Joseph knew of Bodde's high standards. As far as Joseph and Gwei-Djen were concerned, those writings of mine proved to them that I was qualified for the task, and the only thing that remained was for Joseph to make the hard decision to relinquish the task himself, which was first announced in 1946.

I have taken certain minor liberties which must be pointed out to those readers who may consult Needham's own volumes. I have used the convention, which he avoids, of BC and AD for dates, substituting them in my quotations for his plus and minus signs. I have ironed out various passages, particularly translations from the Chinese, by eliminating Chinese words, occasional parentheses and



specialized matter which does not concern the general reader I have also, at Dr Needham's own suggestion, eliminated the extra letter 'h' in Chinese words which he had introduced as a substitution for the aspirate apostrophe. Hence, his *chuen* becomes *ch'en*, etc. The system of transliteration used in this book is thus the pure Wade-Giles system. The Pinyin system which has been adopted by the Chinese government and newspapers around the world in recent years is not suitable, for it would have made reference to Needham's own volumes impossible to the non-specialist.

This book has purposely been prepared without footnotes or other scholarly accessories. Many volumes have continued to appear in the *Science and Civilization in China* series, and the list of those in print should always be consulted by anyone wishing to go more deeply into certain specific subjects. The main aim of this book has been to make Needham's work accessible to the general non-specialist reader, whilst providing an overview for specialists. In preparing the book, I used many typescripts of unpublished material, discussions with Joseph and Gwei-Djen, proofs and oral and written accounts of material that had not yet been published. My account of porcelain was done entirely without the assistance of any material by Joseph, as he never wrote about that subject at all. Those collaborators, such as H. T. Huang, who were generous in helping me in my efforts have been specially acknowledged for it, for which see the *Author's Acknowledgements* (see pages 286-7).

In the 1946 lecture which was so prophetic of his future activities, Dr Needham went on to say

I personally believe that all Westerners, all people belonging to the Euro-American civilization, are subconsciously inclined to congratulate themselves, feeling with some self-satisfaction that, after all, it was Europe and its extension into the Americas which developed modern science and technology. In the same way I think that all my Asian friends are subconsciously inclined to a certain anxiety about this matter, because their civilization did not, in fact, develop modern science and technology.

We need to set this matter right, from both ends. And I can think of no better single illustration of the folly of Western complacency and self-satisfaction than the lesson to be drawn from the history of agriculture. Today a handful of Western nations have grain surpluses and feed

the world. When Asia starves, the West sends grain. We assume that Western agriculture is the very pinnacle of what is possible in the productive use of soil for the growth of food. But we should take to heart the astonishing and disturbing fact that the European agricultural revolution, which laid the basis for the Industrial Revolution, came about only because of the importation of Chinese ideas and inventions. The growing of crops in rows, intensive hoeing of weeds, the modern seed drill, the iron plough, the mouldboard to turn the ploughed soil, and efficient harnesses were all imported from China. Before the arrival from China of the trace harness and collar harness, Westerners choked their horses with straps round their throats. Although ancient Italy could produce plenty of grain, it could not be transported overland to Rome for lack of satisfactory harnesses. Rome depended on shipments of grain by sea from places like Egypt. As for sowing methods – probably over half of Europe's seed was wasted every year before the Chinese idea of the seed drill came to the attention of Europeans. Countless millions of farmers throughout European history broke their backs and their spirits by ploughing with ridiculously poor ploughs, while for two thousand years the Chinese were enjoying their relatively effortless method. Indeed, until two centuries ago, the West was so backward in agriculture compared to China, that the West was the Underdeveloped World in comparison to the Chinese Developed World. The tables have now turned. But for how long? And what an uncomfortable realization it is that the West owes its very ability to eat today to the adoption of Chinese inventions two centuries ago.

It would be better if the nations and the peoples of the world had a clearer understanding of each other, allowing the mental chasm between East and West to be bridged. After all they are, and have been for several centuries intimate partners in the business of building a world civilization. The technological world of today is a product of both East and West to an extent which until recently no one had ever imagined. It is now time for the Chinese contribution to be recognized and acknowledged, by East and West alike. And above all, let this be recognized by today's schoolchildren, who will be the generation to absorb it into their most fundamental conceptions about the world. When that happens, Chinese and Westerners will be able to look each other in the eye, knowing themselves to be true and full partners.







A Chinese illustration of the hoeing method of weeding. The hoe is a long-handled tool with a double-bladed head. The man on the right is gesturing towards the other two men who are using the hoe to dig around the plants.

The more prosperous farmers did not have to rely on such methods for they had animal-drawn hoes which were obviously much quicker. The first type seems to have been a kind of plough without a mouldboard, having two sharp pointed shares. This was dragged along with the shares going each side of the ridge where the crop was growing, a row of the weeds away from each side of the ridge, deepened the furrows of irrigation trenches and further hanked up the soil around the roots of the plants. This type of plough is mentioned in Lu Hsi's book *Expositor of Names* in the second century A.D. Such horse hoes came with single or double blades, which could be adapted for ridging or for more serious weeding. B. Medeleev came up with an improvement called a goose which was attached to the horse hoe. This consisted of two wide flaps with curved iron rods and the deepening of the trench and the pulling of the soil around the roots. Each hoeing by the horse hoe saved several hoeings by hand though it was common for a farmer to follow behind afterwards and hand-hoe a small number of intractable weeds, by way of finishing off the job.

## THE IRON PLOUGH

Of all the advantages which China had for centuries over the rest of the world, the greatest was perhaps the superiority of its ploughs. Nothing defines the backwardness of the West more than the fact that for thousands of years millions of human beings ploughed the earth in a manner which was inefficient, so wasteful of effort and so utterly exhausting, that this deficiency of sensible ploughing may rank as one of the single greatest waste of time and energy.

On the Chinese side the first evidence of the evolution of good ploughs. And when the Chinese plough was first brought to Europe, it was regarded directly as the European agricultural revolution in combination with the growing of crops in rows and the use of the seed drill (so adopted from Chinese practice). Since the agricultural revolution of Europe is generally thought to have led to the Industrial Revolution and to the West's superior power over the rest of the world,



now that the basis of it all came from China and was not by any means indigenous to Europe.

The most basic ancient version of the ardra plough 'alted an ard'. It has a shallow ploughshare and makes only a slight furrow, so is sometimes preferred in areas of continental winds and thin dry soil. Ards can still be seen at work in Sicily, for example. We have painted representations of these implements dating back to the third millennium BC at Uruk (in present-day Iraq). They were often made entirely of wood, and has must have not survived.

Archaeological evidence for early ploughs is very scanty in China. However, archaic Chinese writings from the fourth century BC give evidence for ploughing.

Long-earr-tine ploughshares for ards have been excavated in China which go back as far as the fourth or even early fifth millennium BC. Ox-drawn ards were therefore in use in China from the beginning. Some sixteenth-century BC bronze ploughshares for ardra ploughs (more exactly, turn-ploughs) have been excavated in Tonkin in Vietnam, a region with which China had trade contacts at that time. Most bronze ploughshares, however, must have been made of wood at the time and consequently have not survived.

By the sixth century BC, iron ploughshares became available in China in the form either of iron laid over wood or of solid iron. These were the first iron ploughs in the world. They were attached in a far better way than were ard shares. In the West Greek and Roman ard shares were usually simply tied onto

the bottom of the sole with bits of rope, the two types, called 'stange shares' and 'sleeve shares', were both flimsy and insecure compared to the Chinese ones, even when made of iron.

Improved iron supplies and casting techniques in China by the third century BC led to the design of ploughshares called *kuan*. At this period the Chinese developed a malleable (non brittle) cast iron which was far sturdier for use in agriculture. From the beginning these *kuan* were advanced in their design with a central ridge ending in a sharp point to cut the soil and wings which sloped gently up towards the centre to throw the soil off the plough and reduce friction. From about the time iron ploughs came into circulation, the bow-framed ard began to be ousted in all but the lightest soils and was replaced by heavier and more efficient square-framed turn-ploughs. Turn-ploughs could be used in heavy soils. The turn-plough also made possible the working of much virgin land which could not have been ploughed by ards, which were too light and feeble. Heavy and waterlogged soils now became capable of proper cultivation.

By the first century BC, ploughshares attained weights of over 6 inches and were capable of making really worthwhile furrows, scoured deep in the earth

FIGURE 1. A Chinese illustration of a man ploughing with an ox-drawn ardra plough. The illustration is from a Chinese manuscript of the 14th century AD.





3. In court interview, at the abt 1 hr. in-  
terview was not officially monitored by government  
off. and I am not sure whether it was recorded or not.  
In view of the slight discrepancy between  
the two statements, I am sure that the family  
was not aware of the fact that the police were  
present and that the interview was being recorded.  
The police did not ask any questions. But  
perhaps, given the opportunity, the police  
would have asked questions regarding the  
neighborhood, the layout of the district, the  
high and the beam.

[illegible]

1. The first condition is that the function  $f$  must be continuous on the interval  $[a, b]$ .  
 2. The second condition is that the function  $f$  must be bounded on the interval  $[a, b]$ .  
 3. The third condition is that the function  $f$  must be Riemann integrable on the interval  $[a, b]$ .  
 4. The fourth condition is that the function  $f$  must be Lebesgue integrable on the interval  $[a, b]$ .  
 5. The fifth condition is that the function  $f$  must be measurable on the interval  $[a, b]$ .  
 6. The sixth condition is that the function  $f$  must be non-negative on the interval  $[a, b]$ .  
 7. The seventh condition is that the function  $f$  must be bounded on the interval  $[a, b]$ .  
 8. The eighth condition is that the function  $f$  must be Riemann integrable on the interval  $[a, b]$ .  
 9. The ninth condition is that the function  $f$  must be Lebesgue integrable on the interval  $[a, b]$ .  
 10. The tenth condition is that the function  $f$  must be measurable on the interval  $[a, b]$ .

[illegible]

1. The first of these is the fact that the  
 2. of the population for the year 1960 was  
 3. of the population. The population was  
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 7. of the population. The population  
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[illegible]

Scottish pioneer of scientific plough design, who wrote (unaware that he had been anticipated by 2200 years)

The back of the sock [share] and mouldboard shall make one continued fair surface without any interruption or sudden change. The twist, therefore, must begin from nothing at the point of the sock, and the sock and the mouldboard must be formed by the very same rule.

The Chinese knew, too, that the extra weight of an iron ploughshare and mouldboard were more than compensated by the dramatic reduction in friction of ploughing. Arthur Young wrote in 1797, two million years later:

It appears that the weight of the plough is of little consequence, very contrary to common ideas... The weight of the plough is the least part of the horse's labour; the great object is the resistance met with in the cohesion of the earth, lightness does nothing to overcome this, it is effected by just proportions only.

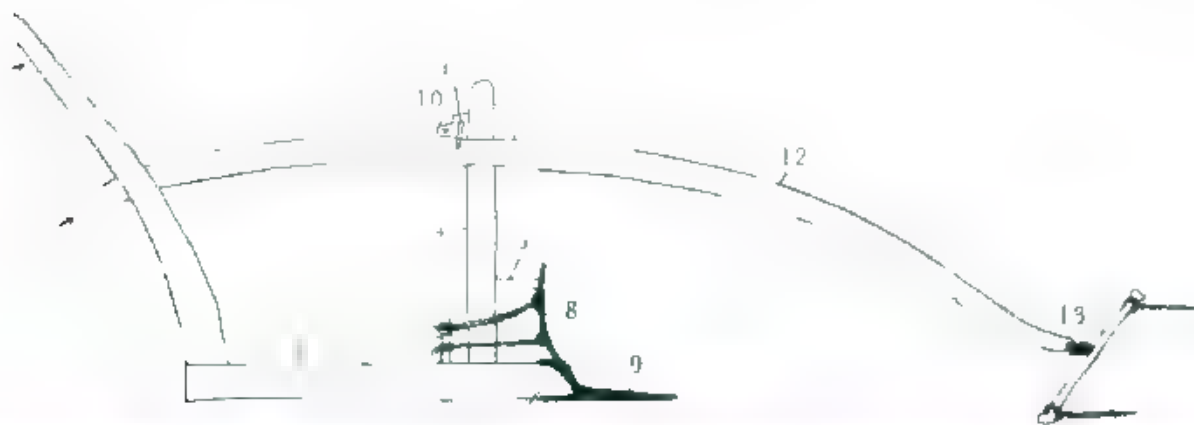
A good mouldboard design turns the clods right over smoothly and with minimum friction, so that with a good plough ploughing becomes like running a knife through butter, and just as a heavier knife will go through butter better, so a heavier plough will make a finer and deeper furrow with less trouble if it has the proper design.

In Europe, mouldboards were completely unknown until late medieval times, and even then they were extremely crude in their design. They were

just flat bits of wood stuck on to the plough to provide an angled surface against which the upturned soil could collide and be deflected. The curved mouldboard, adopted from the outset in China, did not appear in Europe until the eighteenth century, and the lack of it probably caused more hardship to farmers than any other single factor. They had to stop repeatedly and scrape caught-up mud and weeds off their ploughs because there was no smooth connecting surface between the sharp, pointed share which cut the earth and the crude angled board which sent the clods to one side. The increased friction meant that huge multiple teams of oxen were required, whereas Chinese ploughmen could make do with a single ox, and rarely more than two.

Europeans had to pool their resources and waste valuable time and money in getting hold of six to eight oxen to plough the simplest field. This also meant leaving aside much more land for grazing, so that there was less for crops to produce food for human beings. It is no exaggeration to say that China was in the position of America and Western Europe today, and Europe was in the position of say, Morocco. There was simply no comparison between the primitive and hopeless agriculture of

BELOW: FIG. 1. A drawing of the iron plough as described in Lu Hsiang-Shan's book *The Class of the Plough of 880*. The relevant parts are: 1) the ploughshare which cuts the soil; 2) the mouldboard above which turned the soil over neatly as the plough moved forward; 3) the mouldboard brace; 4) the wooden base of the sole or tail, onto which the iron ploughshare was snugly fitted; 5) the bar and 13) the beginning of the whippletree, which was attached to each side of the beam to assist pulling the plough.



Europe before the eighteenth century and the excellent and advanced agriculture of China after the fourth century AD.

Chinese ploughs with mouldboards, were brought to Holland in the seventeenth century by Dutch sailors. And because the Dutch were hired by the English to drain the East Anglian fens and Somerset moors at that time, they brought with them their Chinese ploughs, which came to be called 'Rotherham ploughs'. Thus, the Dutch and the English were the first to enjoy efficient ploughs in Europe. Another name for the Chinese design was the 'bastard Dutch plough'. It was extremely successful on wet, boggy land, and it was soon realized that it would be just as successful on ordinary land.

From England it spread to Scotland, and from Holland it spread to America and France. By the 1770s it was the cheapest and best plough available. Western designers adapted and improved it considerably over the succeeding decades. James Small's plough of 1784 was a step forward, and the various nineteenth-century ploughs of J. Allen Ransome were further improvements. Steel frames were adopted, and the modern plough was born in the nineteenth century as a result of these improved Chinese ploughs. There was no single more important element in the European agricultural revolution. When we reflect that only two hundred years have elapsed since Europe suddenly began to catch up with and then surpassed Chinese agriculture, we can see what a thin temporal veneer overlies our assumed Western superiority in the production of food.

# EFFICIENT HORSE HARNESSES

CLASSICAL PERIOD

## THE TRACIL HARNESS

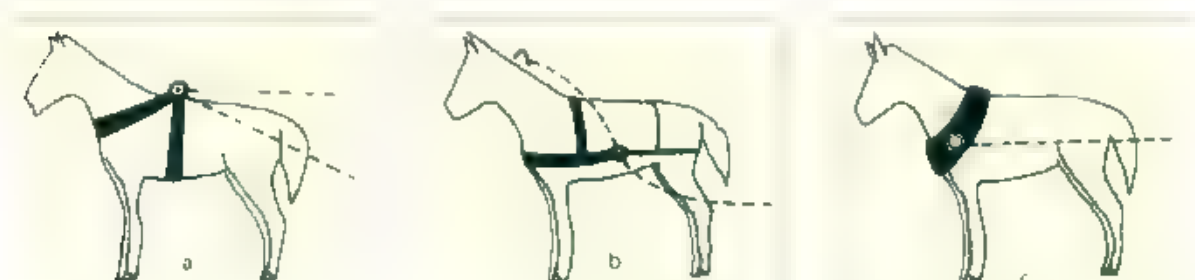
China was the only ancient civilization to develop efficient horse harnesses. There were none in ancient Europe. Thus through most of man's history he has been severely handicapped by the lack of an efficient means of harnessing horsepower for transport. This had an enormous effect on the course of history.

From earliest times until the eighth century AD in the West (and, as we shall see, much earlier in China) the only means of harnessing horses was by the 'throat-and-girth harness'. It was an absurd method since the strap across the throat meant that the horse was choked as soon as he exerted himself. Yet for thousands of years, nobody could think of anything better. As long as man was restricted to the use of this pathetic harness, horsepower was all but useless for transport by cart. Even individual riders could not manage their mounts at a gallop. The confusion and slaughter of cavalry battles must have been much increased by inadequate harnessing. Long-distance rides would have been seriously impeded, no matter how good the horse and rider, by the fact that the poor horse was being not merely tired but also choked half to death. If ever the feebleness of human ingenuity has been displayed, it is by the fact that mankind was prepared to put up with the throat-and-girth harness for millennia.

Those who read about ancient Rome are often struck by the importance attached to the shipping of grain from Egypt. Without Egyptian grain, Rome

2. The collar harness, used in the third century BC by the Chinese, used the greater refinement. Again, the load is borne by the skeletal system by means of the pull on the chest bone (sternum). The collar is padded to avoid chafing the horse's skin.

(b) The trace harness, with its breast strap, which was in use in China by the fourth century BC. The horse can exert itself with this harness since the pressure is on the chest bone (sternum), rather than the throat. The load is therefore borne by the horse's skeletal system rather than his muscles. (c) The collar harness. From the third century BC the Chinese used this greater refinement. Again, the load is borne by the skeletal system by means of the pull on the chest bone (sternum). The collar is padded to avoid chafing the horse's skin.











The voke was also acquired in various illustrations of it or, notably, in the Bayeux Tapestry of 1130, where it is now called a *voke* (Fig. 1).

### THE COLLAR HARNESS

The most efficient harness is the collar harness. It may be seen in the diagram in Figure 2. In the beginning this harness effectively overcame a deficiency in the horse's anatomy and supplied a horse with a feature of the ox. An ox has a perfectly horizontal spine, with its hump more or less above the shoulders. A voke can be fitted there with great ease, enabling considerable weights to be pulled. But a horse's neck is on an upward slope and has no hump. The earliest Chinese collar harness provided the horse with an artificial hump to which a yoke was then attached. In other words the horse was transformed into an ox substitute by the collar and the hump it created at the top of the horse's neck. The collar was padded to avoid rubbing and causing sores on the horse's back.

The earliest evidence for the collar harness in China may be seen in a rubbing from an ancient brick, showing the collar harness on three horses pulling a chariot. It dates from some time between the fourth and first centuries BC. Therefore, we must consider the collar harness as having been invented in China by the first century BC at the latest. This is a full thousand years before its appearance in Europe, a century after the trace harness.

After some time, it was found by the Chinese that the collar could be used in another and simpler way: traces could be attached from the sides of the collar directly to the vehicle. It is this form of the collar harness which is used today in much of the world.

In connection with the collar harness of the modern form, the Chinese invented the whippetree, which is an attachment to a vehicle. If two horses pull a modern cart, the collars and traces lead to the whippetree. The earliest evidence of the whippetree in China goes back to the third century AD, in use with oxen.

One other factor in the invention of the collar harness might have been that similar collars had for some time been used to place baggage onto Bactrian camels. China had a Camel Corps and considerable familiarity with large numbers of the animals by the second century BC at the latest. The camel pack saddle at that time was a felt-padded, horseshoe-shaped wooden ring, and, with some modifications, could be substituted for a horse.

## THE ROTARY WINNOWER FAN

The Chinese were about two thousand years ahead of the West in their approach towards the winnowing of grain. The means used to separate out husks and stalks from the grain after harvest and threshing. The earliest method goes back even before the cultivation of crops: the grain is thrown up into the air, preferably by a strong wind so that the chaff is blown away while the grain falls down to the ground. Later, winnowing baskets were used, which required dextrous handling. With the right kind of rhythmic wrist movement, one can separate the heavy grain from the chaff, which is gradually tipped over the edge of the basket, leaving the grain behind. Later still, the winnowing sieve was introduced.

But the Chinese were not satisfied with waiting for a strong wind for the tossing method, or with the slow and laborious basket and sieve methods. By the second century BC they had made a brilliant invention: the rotary winnowing fan. Models of them have been found in ancient tombs, made of pottery and with miniature working parts.

Grain was put into a hopper and was subjected to continuous streams of air which came from a crank-operated fan. The fan had a large air inlet behind it,

and was set at the end of a broad sloping tunnel leading toward the grain. The air from the fan blew the chaff away and out through a vent. The grain then fell down into a chaff-free pile beneath. One type of rotary winnowing fan was portable. This was an important development because the original machine was expensive, but could now be rented out, so enabling owners to recoup their costs. Another type was operated not by a small crank handle suitable for one person, but by a tread connected to a crank wheel, leaving the operator's hands free to carry out other tasks at the same time.

The primary use of rotary winnowing fans was generally in the south of China, in connection with rice. Although apparently invented and first used in the north with wheat and millet, after several centuries the use shifted southwards and the device, for various economic reasons, was largely forgotten in the north. Many farmers reverted to the traditional tossing and hand-sifting of grain because they could not afford the fans.

A poem by the poet Mei Yao-Chen, or Me Sheng Yu, survives from the eleventh century celebrating the rotary winnowing fan:

There on the threshing floor stands  
the wind-maker,  
Not like the feeble round fans of  
the dog-days.  
But wood-wheeled and fan-cranked,  
a cunning contrivance,  
He blows in his tempest all the  
coarse chaff away,  
Easy the work for those manning  
the handles –  
No call to wait for the weather, the breezes  
To free the fine grain from its husks,  
that our fathers  
Needed for tossing their baskets on high.

The rotary winnowing fan was exported to Europe brought there by Dutch sailors between 1700 and 1720. Apparently they had obtained them from the Dutch settlement of Batavia in Java, Dutch East Indies. The Swedes imported some from south China at about the same time and the Jesuits had taken several to France from China by 1722.





ABOVE (19) A glazed pottery model from the Han Dynasty (207 BC-220 AD) showing a grain pounder and a rotary grain mill. The figure on the right is turning the crank handle of a rotary winnowing fan, which was invented in the second century BC in China but did not reach Europe until the sixteenth century. Grain was poured into the open receptacle at the top for winnowing inside the machine. (The Seattle Art Museum's Eugene Fuller Memorial Collection)

Until the beginning of the eighteenth century, no rotary winnowing fans existed in the West. Until then, tossing into the air with a shovel and sifting in winnowing-baskets were the primary techniques, though roughly fanning with canvases, blankets, and so on was occasionally practised from at least the early sixteenth century. But this rudimentary fanning was very rare and only adopted by the most professional farmers. It is estimated that the most advanced winnowing technique in common use in Europe before the eighteenth century was the winnowing basket. It could yield about 99 pounds of winnowed grain per hour, if done by an expert. But in the eighteenth century the Swedes studied a Chinese rotary winnowing fan which they had transported to Gothenburg, and discovered it could process an astonishing seventeen barrels of grain per day. European engineers were not slow to improve on the Chinese design: adapt it to European grain sizes, and even (something which the Chinese never did) combine it with threshing by machine as well.

Once more, we see the Chinese giving the West one of the most essential tools for the Western agricultural revolution. We might note, by way of a footnote, that the actual traditional Chinese rotary winnowing fan, though developed and improved immensely in the West, still survives in its basic form in the Third World countries of today, where it is found to be cheaper and more practical than modern Western versions.

## THE MULTI-TUBE ('MODERN') SEED DRILL

—EUGENE F. SCHMIDT

It may come as a surprise to those who are unfamiliar with the history of Western agriculture to learn that the West had no seed drills until the sixteenth century AD. Until the seed drill was adopted, broadcasting of seed by hand was practised. This was appallingly wasteful, and it was common for as much as half the crop to have



to be saved for sowing the next year. Of those seeds which then germinated, many fell into hollows in the ground, with the resulting plants all being clumped together, competing for moisture, light and nutrients. Also, proper weeding was out of the question because it was impossible to get at the weeds.

Although it never made its way to Europe, the Sumerians of the Middle East had a primitive single-tube seed drill 3500 years ago. But it was the multi-tube seed drill invented by the Chinese in the second century BC (and adopted also in India) which made possible the efficient sowing of crop seed for the first time in history. The drill is pulled along behind the horse, ox, or mule and dribbles the seed at a controlled rate into straight rows.

Small iron seed drill shares have been excavated in China, dating from about the second century BC. A government official named Chao Kuo introduced the seed drill to the metropolitan area of the capital in 85 AD. We read of this in a surviving fragment of a book called *On Government*.

Three ploughshares were all drawn by one ox, with one man leading it, dropping the seed and holding the drill simultaneously. Thus, 100 *mu* could be sown in a single day.

The later agriculturalist, Wang Chen, gives more details.

The *hiao* – or sowing shares – are the shares that trace the drill, like a triangular ploughshare but smaller, with a high ridge down the centre, 4 inches long and 3 inches wide. They are inserted into the two holes at the back of the seed-drill's feet and bound tightly to the crosspiece. The share bites 3 inches or so deep into the soil, and the seed dribbles down through the foot of the drill, so it is sown very deep in the soil and the yield is improved. Soil tilled with a seed-drill looks as if it had been gone over with a very small plough.

The Chinese system was at least ten times as efficient as the European one, and could be up to thirty times as efficient, in terms of harvest yield. And this was the case for seventeen or eighteen hundred years. Through all those centuries, China was so far in advance of the West in terms of agricultural productivity that the contrast, if the two halves of the world had only been able to see it, was rather like the contrast today

between what is called the 'developed world' and what is called the 'developing world'.

The inspiration for the first Western seed drills came from China. But because seed drills were mostly used in north China, far from the ports of south China frequented by Europeans, actual specimens were not transported to Europe for examination. What came over was a rather imprecise account and description of the device. Word of mouth combined with inadequate descriptions and pictures in Chinese books meant that the frustrated Europeans receiving this news could not quite fully understand it. They were therefore forced to reinvent the seed drill. As a result, European seed drills were based on principles quite different from the Chinese principles. This was a case of 'stimulus diffusion' – the transmission of an idea without the accompanying details of construction. So the Europeans finally got their seed drills, but at the cost of working it all out from scratch.

The earliest European seed drill was patented by the Venetian Senate in 1566; its inventor was Camillo Torello. The earliest for which we have detailed descriptions was that of Tadeo Cavalina of Bologna, in 1602; it was very primitive. The first really sound seed drill in Europe was that developed by Jethro Tull. This drill was first produced soon after 1700, and descriptions of it published in 1731. However, seed drills of this and successive types were both expensive and unreliable, as well as fragile. Sturdy, sound seed drills became available in quantity in Europe only in the mid-nineteenth century. Until that time Jethro Tull's vision of an agricultural revolution was somewhat delayed in its full form.

There had been a very fine seed drill in the eighteenth century in Europe, invented by James Sharp, but it was only for single-row sowing and was too small, so that its perfect functioning did not attract sufficient interest. Basically, it was a lack of engineering skill which made European seed drills essentially ineffective and uneconomical until the middle of the nineteenth century. Thus, two centuries of knowledge of seed drills were wasted, due to the failure to exploit the principles properly.

OPPOSITE 13: The radio-tube seed drill was in use in China by the second century BC. Europeans had no seed drills at all until the nineteenth century. Here we see spring wheat being sown in north China in an engraving published in 1442 in *Compendium of Maps and Days* compiled by Qi Er-hua.

北耕兼種圖

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# Part 2

## ASTRONOMY AND CARTOGRAPHY

RECOGNITION OF SUNSPOTS AS SOLAR PHENOMENA  
FOURTH CENTURY B.C.

Chinese

《Kan Te app

and characteristics of the

Sunspot. The  
history of





807 AD, or eight centuries before Galileo's first observation of sunspots in 1610.

Later sunspot observations in the West were made by the Arab Abu al-Fadl Ja'far ibn al-Muqaffi in 840 AD, by Ibn Rushd about 1196, and by Italian observers around 1457. Galileo's priority in the seventeenth century was disputed by the Jesuit Christopher Scheiner in Holland, by Fabricius in Germany, and by Thomas Harriot in England, all of whom seem to have seen the sunspots before Galileo did.

Niedham has counted the numbers of sunspot observations in the official histories between 28 BC and 1638 AD, and has found 112 instances. There are also hundreds of notices of sunspots in other Chinese books during the centuries, but no one has ever had the time or stamina to collect them all together in a body. These Chinese records are the oldest and longest continuous series of such observations in the world. Many of the specific descriptions are full of interest. Extensive, though incomplete, lists of them exist in various old Chinese encyclopedias, and some of these have been published in English. The extreme importance of these lists may be seen from the fact that modern astronomers have tried to analyze them to determine cycles in the occurrence of sunspots. It is well known that a period of about eleven years appears during which sunspots seem to increase, decrease, and then begin to increase again.

Since these cycles have an effect upon the Earth's ionosphere and weather ('magnetic storms' in the atmosphere are related to sunspot periods), the more we know about these the better. By studying the most complete available list of the Chinese material, the Japanese astronomer Shigeru Kanda believed he had detected a 975-year cycle in sunspots. If the Sun has a period of 975 years, that may have important implications for weather cycles on our planet, and directly affect the futures of us all.

## QUANTITATIVE CARTOGRAPHY

THE CHINESE WAY

The science of map-making took a great step forward when Chang Heng invented quantitative cartography in the second century AD. Chang was the inventor of the first seismograph (page 177) and one of China's leading scientific figures. He first applied the grid system to maps so that positions, distances and itineraries could be calculated and studied in a more

scientific way. The Chinese tradition of applying grids to maps eventually developed so far that by the Middle Ages schematic grid-maps were actually appearing with only the grid and names, omitting the map itself (See Plate 13 (page 34)). Geographical positions on such extreme mathematical abstractions were determined by counting the X and Y coordinates of the grid. This was quantitative cartography of a kind more suitable to a computer since it entirely dispensed with images.

Chang Heng's own works on cartography are lost. He wrote a book entitled *Discourse on New Cartography*, which apparently laid the groundwork for the mathematical use of the grid with maps; another of his books seems to have borne the title *Bird's-Eye Map*; and we know that he presented a map to the emperor in 116 AD. The most important piece of evidence we have regarding his role, however, is the statement in the official history of the Han Dynasty that he 'cast a network of co-ordinates about heaven and earth, and reckoned on the basis of it'.

In the third century, Chang had a successor in the scientific study of cartography. He was P'ei Hsu, who in 267 was appointed Minister of Works by the first emperor of the Chin Dynasty. The official history quotes the following from his preface to a great map in eighteen sheets which he presented to the emperor:

The origin of maps and geographical treatises goes far back into former ages. Under the three dynasties [Hsia, Shang and Chou] there were special officials for this. Then, when the Han people sacked Hsien-yang, Hsiao Ho collected all the maps and documents of the Chin. Now it is no longer possible to find the old maps in the secret archives, and even those which Hsiao Ho found are missing; we only have maps, both general and local, from the later Han time. None of these employs a graduated scale and none of them is arranged on a rectangular grid. Moreover, none of them gives anything like a complete representation of the celebrated mountains and the great rivers; their arrangement is very rough and imperfect, and one cannot rely on them. Indeed some of them contain absurdities, irrelevancies, and exaggerations, which are not in accord with reality, and which should be banished by good sense.

In making a map there are six principles observable

1) The graduated divisions, which are the means of determining the scale to which the map is to be drawn

2) The rectangular grid (of parallel lines in two dimensions), which is the way of depicting the correct relations between the various parts of the map.

3) Pacing out the sides of right-angled triangles, which is the way of fixing the lengths of derived distances (i.e., the third side of the triangle which cannot be walked over)

4) Measuring the high and the low

5) Measuring right angles and acute angles

6) Measuring curves and straight lines These last three principles are used according to the nature of the terrain, and are the means by which one reduces what are really plains and hills to distances on a plane surface

If one draws a map without having graduated divisions, there is no means of distinguishing between what is near and what is far. If one has graduated divisions, but no rectangular grid or network of lines, then while one may attain accuracy in one corner of the map, one will certainly lose it elsewhere (i.e., in the middle, far from guiding marks). If one has a rectangular grid, but has not worked upon the principle of pacing out the sides of right-angled triangles, then when it is a case of places in difficult country, among mountains, lakes or seas (which cannot be traversed directly by the surveyor), one cannot ascertain how they are related to one another. But if we examine a map which has been prepared by the combination of all these principles, we find that a true scale representation of the distances is fixed by the graduated divisions. When the principle of the rectangular grid is properly applied, then the straight and the curved, the near and the far, can conceal nothing of their form from us.

Pei Hsu's actual map has not survived. Note that it was placed in the secret archives. This was not exceptional, for throughout history, and especially in China, the possession of superior maps was the key to political and military success, analogous to having advanced strategic weapons today. Shen Kua, in his

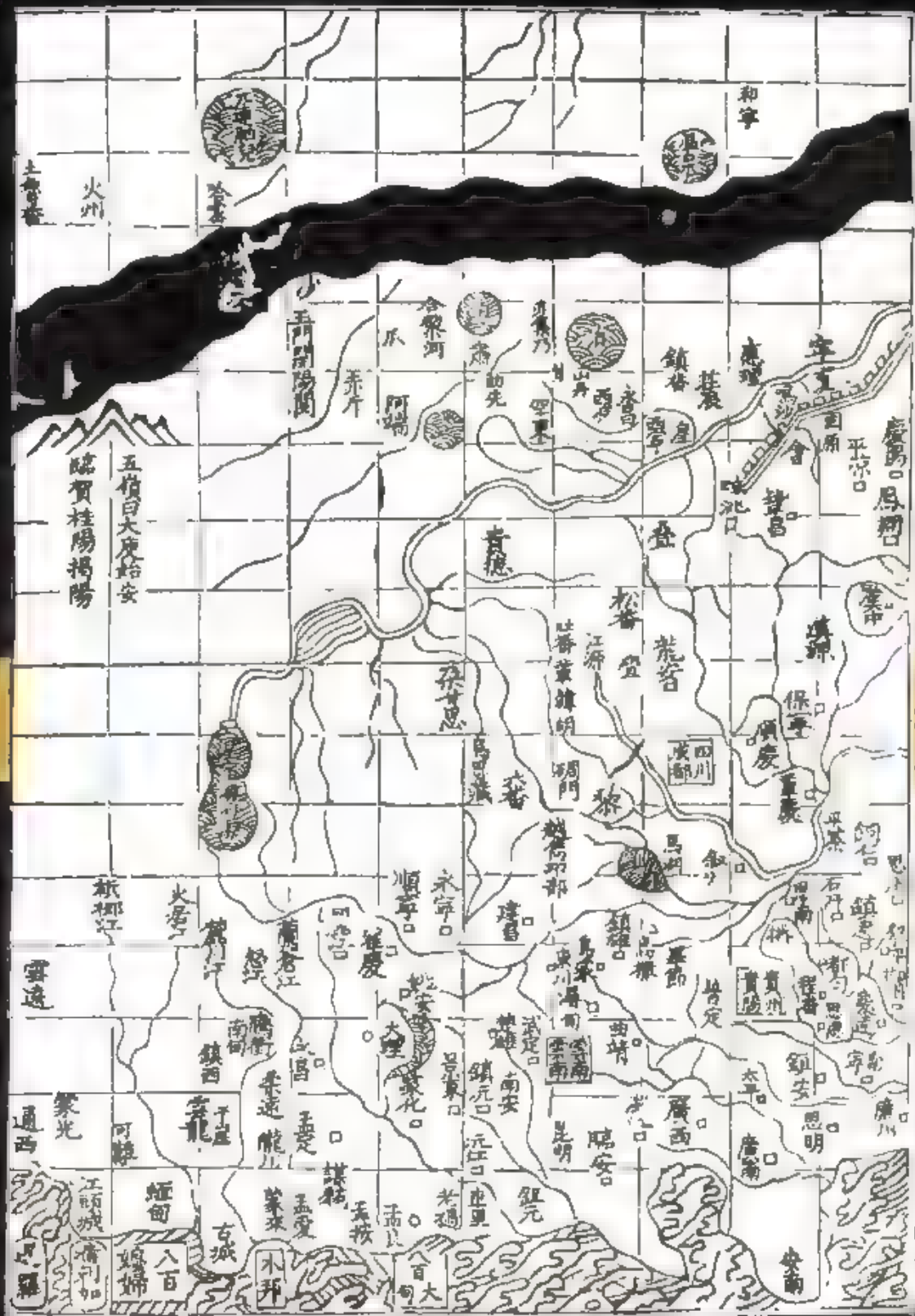
*Dream Pool Essays* of 1086 gives the following illuminating story

In the Hsi-Ning reign-period [1068 to 1077 AD] ambassadors came from Korea bringing tribute. In every *hsien* city or provincial capital which they passed through they asked for local maps, and these were made and given to them. Mountains and rivers, roads, escarpments and defiles, nothing was omitted. When they arrived at T'iehchow they asked for maps, as usual, but Ch'en Shu-Kung, who later became Prime Minister but was at that time in charge of the military guard at Yangchow, played a trick on them. He said that he would like to see all the maps of the two Chelung provinces with which they had been furnished, so that he could copy them for what was now wanted, but when he got hold of them, he burnt them all, and made a complete report on the affair to the emperor.

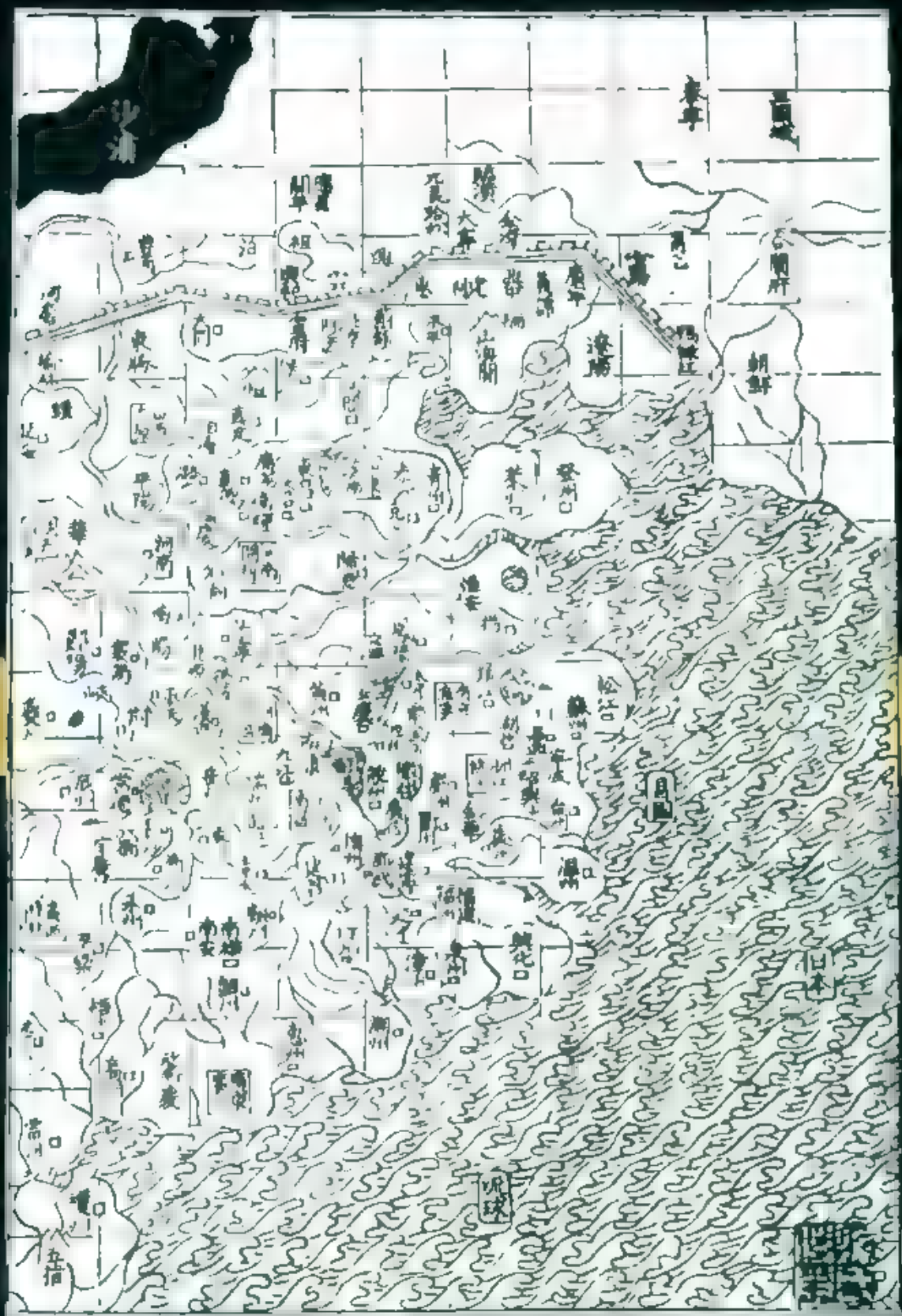
It is easy to understand how so many early maps did not survive, they were not copied, and were frequently destroyed. Their information was simply too dangerous to risk its falling into the wrong hands. However, two splendid maps of the eleventh century carved in stone survive. Both are preserved in the Pei-Lin Museum at Sian in China. One of them, 'Map of the Tracks of Yu the Great', has a rectangular grid laid over it. It is generally superior to the other map, and especially so with regard to the coastal details, also it includes the Shantung peninsula, which the other has omitted. But the other incorporates much more accurate information about the south-western rivers. The two maps therefore each display a regional bias.

Another great map is that of Chu Ssu-Pen, prepared between 1311 and 1320. This map existed only in manuscript for two centuries but was finally printed in about 1555 in the *Enlarged Terrestrial Atlas* in an edition by Lo Hung-Hsien (1504-64). Lo says of the map

Chu Ssu-Pen's map was prepared by the method of indicating the distance by a network of squares, and thus the actual geographic picture was faithful. Hence, even if one divided the map and put it together again, the individual parts in the east and west fitted faultlessly together. His map was seven feet long and therefore inconvenient to unroll, I have therefore now arranged it in book form on the basis of its network of squares.







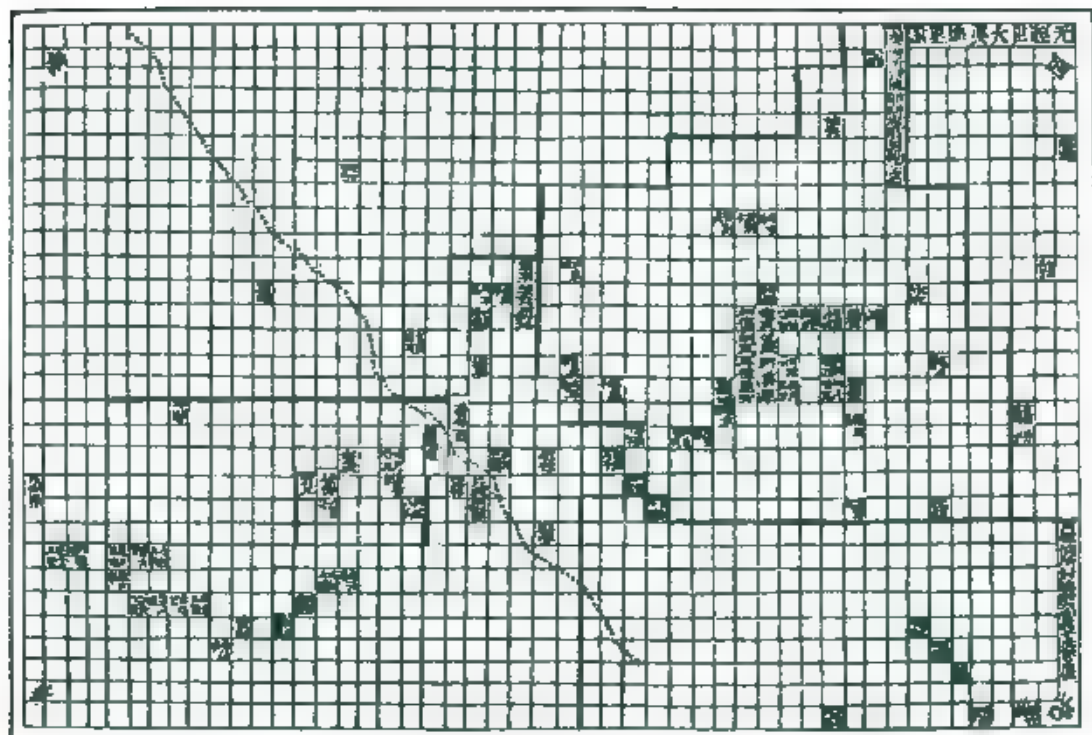


Abb. 16. The grid used to reduce the size of this map of the north-western part of China which has North in the bottom right-hand corner. Places are simply marked off where they lie on the grid and other surface features are ignored. This is the Mongolian Style of cartography, from the fact that it was used by the Mongols in the Yuan Dynasty of China. The map is from the book of that date, *History of Institutions of the Yuan Dynasty*.

Thus we see the grid used successfully to reduce the size of the map in a manner analogous to photographic reduction (See Plate 12 (page 32-3)).

What was happening in Europe while all this was going on? After the time of Ptolemy (c. 120-170 A.D.) Western map-making degenerated under the influence of religion to a point scarcely credible. For instance a well-known Western world map from a manuscript of 1170 is so pathetically inaccurate that it hardly even rates the description of 'map'. It was only during the Renaissance that respectable maps once more began to be found in Europe. Fourteenth-century sailing charts (called portolans) were of good quality, but reasonable maps of larger areas did not appear in Europe until the fifteenth century – thirteen hundred years after Chang Heng introduced scientific, quantified cartography in China.

## DISCOVERY OF THE SOLAR WIND

SOLAR WIND

Comet tails always point away from the Sun, blown that way by the solar wind. The Chinese were history's most noted observers of comets. The computation of approximate orbits for about forty comets appearing before 1500 have been based almost entirely upon Chinese records of their sightings. Comet movements were described with such precision by the Chinese that many precise trajectories across the sky can be drawn on a star map, simply from reading an ancient Chinese text. This report of 1472 describes one comet's movement.

Suddenly it went to the north, touched the star 'Right Conductor' (in Bootes), and swept through the 'Enclosure' of stars in Virgo, Coma Berenices and Leo, touching *in* Coma Berenices, 2629 Coma Berenices, E Leonis, and 2567 Leonis. Its tail now pointed directly toward the west. It swept transversely across a to k Comae Berenices. On a *chia-mao* day its tail had greatly lengthened. It extended from east to west across the heavens. The comet then proceeded northwards, covering about 28° touched *iota*, *theta* and *chi* Bootes, swept through the Great Bear, and passed near the three small stars at the north of Canes Venatici and *chi* Ursa Majoris.

It will be noticed with what attention the precise position and direction of the tail of each comet was studied. (The stars named here are obviously the modern equivalents, the Chinese names being omitted.)

From at least the seventh century AD, and probably the sixth, the Chinese observations of comet tails had been refined enough to establish the principle that comet tails always point away from the Sun. We find a clear statement of this principle in the official history of the Tang Dynasty for 635 AD: 'In general, when a comet appears in the morning, its tail points towards the west, and when it appears in the evening, its tail points towards the east. This is a constant rule. If the comet is north or south of the Sun, its tail always points following the same direction as the light radiating from the Sun.'

The astronomers of that time already realized that comets shine by reflected light, like the Moon. It is now known that comet tails always point away from the Sun because they are so tenuous that the force of the 'solar wind' pushes them away into that position. In other words, radiation from the Sun has sufficient force to act upon them as a wind would do.

Did the Chinese in the sixth century AD merely discover this empirically, or go so far as to formulate the notion of the 'solar wind' itself? There is no unambiguous evidence, but on balance it is highly likely that the Chinese did not even need to formulate the theory of the 'solar wind'. It would have been so congenial to their underlying assumptions about the Universe that it would probably have been taken for granted as the explanation as soon as they had formulated (as in the text of 635 AD above) the principle that comet tails followed the same direction as the Sun's radiation. For Chinese literature is replete with countless references to the *ch'i* of the Sun's radiation. This concept of *ch'i*, which is essentially untranslatable, can in this context be thought of as the 'emanative or radiative force' coming from the Sun. To the ancient Chinese it would have been obvious, believing as they did in this *ch'i*, that the Sun's *ch'i* was strong enough to blow the tails of comets away from the Sun, as in a high wind. And that the Chinese conceived of space as being full of strong forces, we can see in our account of manned flight with kites (page 191).

Figure 1. A diagram of a comet tail pointing away from the Sun, illustrating the principle that comet tails always point away from the Sun. The diagram shows a comet with a tail pointing away from the Sun, which is represented by a small circle. The text explains that the tail always points away from the Sun, regardless of whether the comet is in the morning or evening. This is a constant rule. If the comet is north or south of the Sun, its tail always points following the same direction as the light radiating from the Sun. This principle was discovered by Chinese astronomers in the sixth century AD. The diagram also shows a comet with a tail pointing away from the Sun, illustrating the principle that comet tails always point away from the Sun. The text explains that the tail always points away from the Sun, regardless of whether the comet is in the morning or evening. This is a constant rule. If the comet is north or south of the Sun, its tail always points following the same direction as the light radiating from the Sun. This principle was discovered by Chinese astronomers in the sixth century AD. The diagram also shows a comet with a tail pointing away from the Sun, illustrating the principle that comet tails always point away from the Sun. The text explains that the tail always points away from the Sun, regardless of whether the comet is in the morning or evening. This is a constant rule. If the comet is north or south of the Sun, its tail always points following the same direction as the light radiating from the Sun. This principle was discovered by Chinese astronomers in the sixth century AD.

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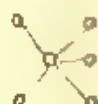
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房星位



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THE FIRST CHINESE STAR  
MAP drawn on a Mercator  
projection. It is preserved  
by Sir Aurel Stein at Tunhuang.

It represents the sky as long this  
way and compressed this way.

It is from the Ming or Ching

dynasty and Sir Aurel Stein is  
the target at which the bow

is a bow at bow or right

pointing here & stars are

in their place and for a

others to indicate that they

were discovered, or at least

discovered, by

Chinese astronomers

in the Ming Dynasty



## THE MERCATOR MAP-PROJECTION

The Mercator map-projection is the map of the world most commonly seen on the walls of classrooms, in which Greenland is enormous and the north and south polar regions appear larger than Europe and America.

The projection is a cylindrical projection, that is, if one inserted a transparent globe of the Earth in the centre of a hollow cylinder and then turned on a light-bulb inside the globe, the features of the Earth's surface thrown onto the cylinder would be those of the Mercator projection. The equator is a straight line running across the middle of the Mercator projection and only the features near the equator are anything like their proper shapes. The higher up and lower down on the globe, the more the features are distorted by being cast onto portions of the cylinder which are further away. The projection is virtually useless for land travel, but is very popular at sea because it has the peculiar feature that a navigational course drawn on it comes out as a straight line, whereas with other maps such courses are arcs.

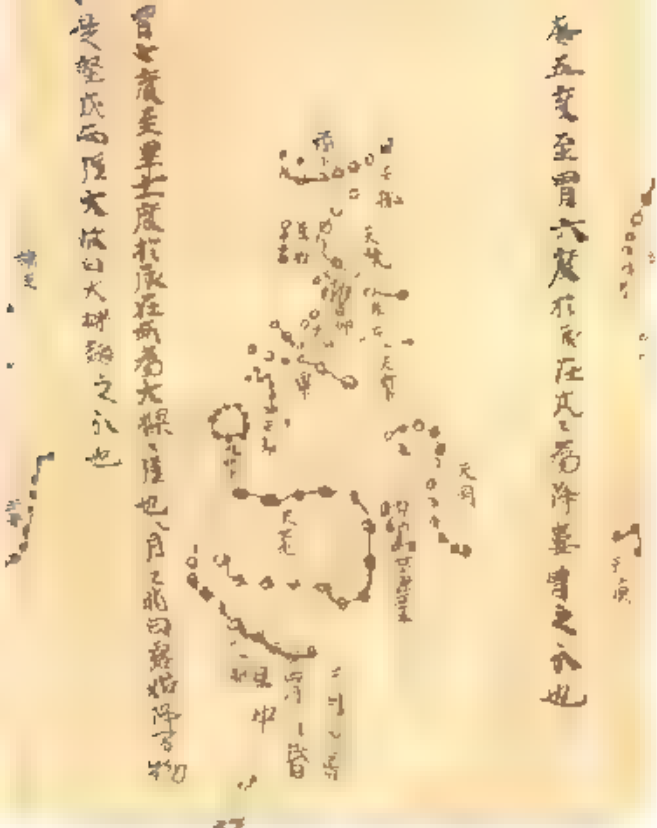
The Mercator projection originated, in Europe, as the presumed invention of Gerardus Mercator, which is the Latin name of Gerhard Kremer (1525-1594), a Flemish mathematician and geographer. He

published the first map on Mercator's projection, a navigation map, in 1568.

The cylindrical projection, however, was used by the Chinese centuries before Mercator. A manuscript star map dating from about 940 A.D. is preserved in the British Library (see Plate 15 (above)). This map presents the celestial globe (that is the sky portrayed as a globe) as projected onto a surface by the cylindrical projection technique. The Chinese divided the sky into twenty-eight sections called *hsiu*, which were rather like the sections of an orange. They were 'lunar mansions' (stages of the moon's progress through the sky) with the pole at their centre. In this star map, the *hsiu* are represented as long rectangles centred on the equator and very distorted towards the poles.

A century and a half later, Su Sung (see page 121) published further Mercator style map-projections in his book *New Design for a Mechanical Armillary Sphere and Celestial Globe*, published in 1094. One of these had a straight line running across the middle as the equator and an arc above it, the ecliptic. The rectangular boxes of the lunar mansions are clearly seen, with the stars near the equator being more tightly packed together and those near the poles spread further apart. Su Sung published two star maps on the 'Mercator projection' and two on polar projections. These are the world's oldest published star maps of any kind.





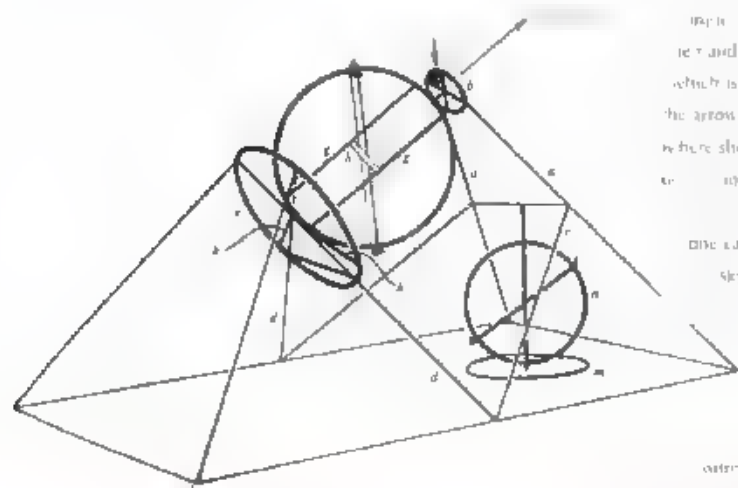
## EQUATORIAL ASTRONOMICAL INSTRUMENTS

(PLATE 1, FIG. 1)

Modern astronomical observatories derive from a Chinese, not a European tradition, which makes an understanding of sky positions easier. They are oriented and mounted according to what is known as

the equatorial system of astronomy. This is traditionally Chinese, and it goes back to at least 2400 B.C. It takes the equator as the horizontal circle around the side of the instrument, and the pole as the top point. This may seem simple and obvious, but it was not the system used by our own European ancestors. In our tradition, which is called 'ecliptic', the two horizontal circles which were of importance were not the equator but the horizon and the ecliptic (the circle described by the Sun's motion in the sky, which is the same plane as the Earth's orbit around the Sun). Whereas Europeans more or less ignored the equator, the Chinese largely ignored the horizon and the ecliptic. But when making astronomical observations it came to be realized in seventeenth-century Europe that the Chinese system of equatorial astronomy was more convenient and showed greater promise. So it was adopted by Tycho Brahe, 1576-1601, and his successors and is still the basis of modern astronomy today.

The Chinese system was really very simple. Everything was conceived of as radiating from the celestial pole as if it were the point where the stems of an orange were attached. The sky was then divided up into twenty-eight sections rather like orange segments, known as *hans*, or lunar mansions. Each one of these *hans* contained certain star constellations which were known and given names. Since the pole star and the stars near it never set beneath the horizon at any time during the year (whereas most stars do) the Chinese gave greatest attention to them, and by noticing



LEFT (FIG. 1). A diagram of K'ao Shou-ching's equatorial instrument.

They noticed that the observer could see the Pole Star by standing horizontally and looking up through the centre of the equatorial circle 'a', which is 6 feet in diameter, through the small circle 'b' and along the arrow pointing at the Celestial Pole. The central sighting tube 'c' was shown pointing straight upwards. It could be rotated with the equatorial ring 'd' for the observation of various stars at those positions marked off on the several rings. Thus, whatever star one cared to look at, its azimuth, bearing or its position in the sky would be indicated by sight. It is the fact that the Pole Star was centrally situated. This is what is meant by the instrument being equatorially mounted. The system was adopted from Chinese astronomy by Europeans in the seventeenth century and is still used today. The azimuth circle 'm' and the altitude instrument circle 'n' were like the other circles graduated with degrees marked into the rings. A full description of the instrument is given by Needham from whom this diagram is taken.

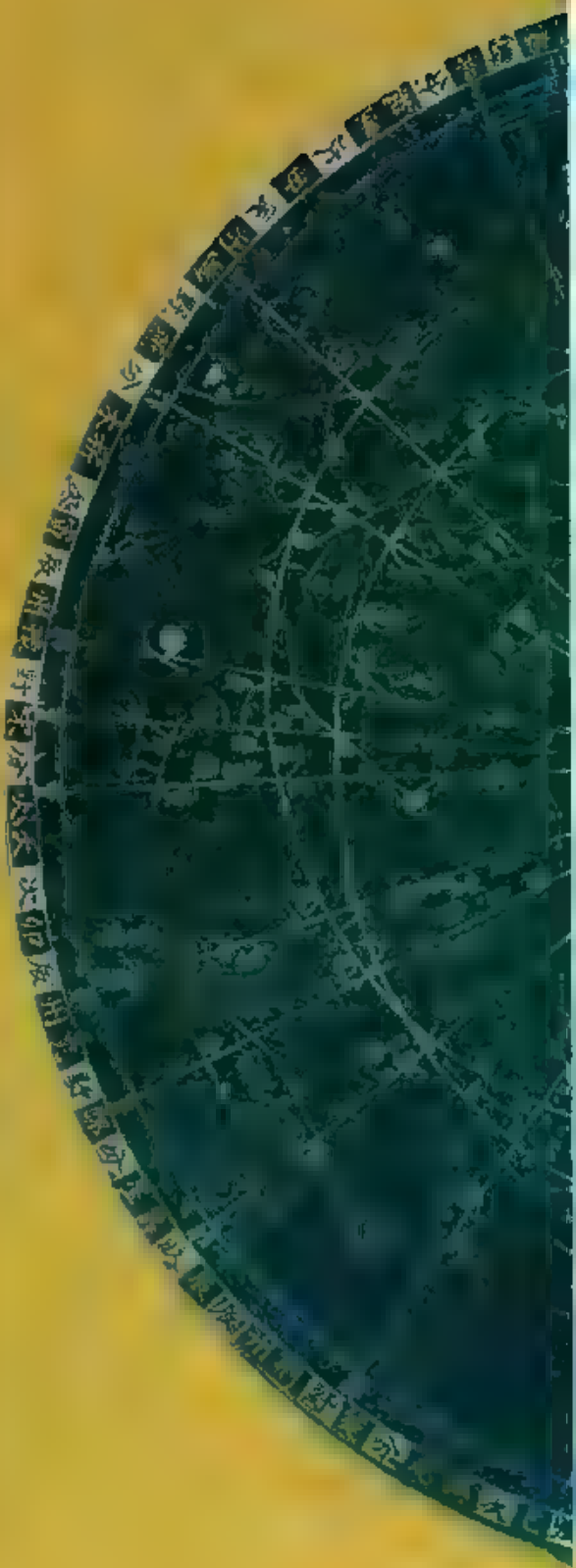
where the stars at the top of a sky segment were, they could then precisely specify where the stars at the bottom of the same sky segment were, even though they might be invisible beneath the horizon.

To do this sort of thing with precision required instruments. The Chinese had such superior expertise in metal casting, having after all invented cast iron (see page 44), that they made large and impressive instruments of bronze and iron. These would take the form of huge metal rings precisely graduated with the degrees of the circle. Different rings representing different sky-circles would then be joined together at the two points where they crossed one another forming what looked like the skeletons of spheres. These we call armillary spheres, from the Latin word *armilla*, meaning 'bracelet'. One ring would obviously represent the equator. Another would represent what is called the meridian, which is a great sky-circle that passes directly over one's head and also through the pole.

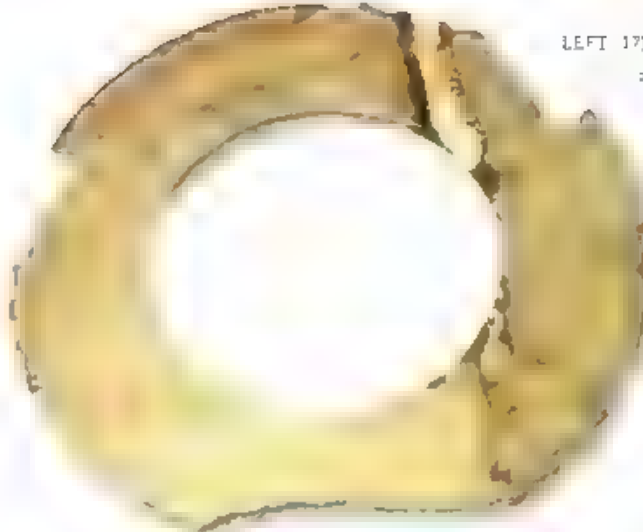
These instruments also had sighting-tubes, through which one could peer at particular stars. The sighting-tube was moved along the equator ring until a star was found. Then one counted the number of degrees marked on that ring back to the meridian ring, which stood up from it vertically. As soon as the degrees had been counted, the exact position of the star along the equator would become clear and one could tell what sky segment it was in. By such means as these, star maps were drawn with great precision, and positions of stars were recorded. The sky became not a maze of points of light, but a sensibly ordered arrangement of constellations. And to make sense of the night sky is after all, what astronomy is.

Armillary rings still exist today in the form of the mountings which allow the great modern telescopes to be oriented to particular points in the sky. But instead of mere sighting-tubes today we have the additional aids of lenses or mirrors to peer at our stars so we can not only find the star positions, but stare closely at the stars, magnified greatly, and observe things about them that are not apparent to the unaided eye. In the past, finding the positions of stars was an end in itself; today it forms the basic framework enabling us to carry out further studies.

The Chinese astronomer Keng Shou-Ch'ang introduced the first permanently mounted equatorial armillary ring in 52 BC, and the astronomers Fu An and Chia Kuei in 84 AD added a second ring to show the ecliptic. Chang Heng (who also invented the first seismograph — see page 177) added a ring for the







LEFT 17) A jade circumpolar constellation template. An ancient Chinese astronomer would have held this up at approximately arm's length with the Pole Star in the centre. The jagged outer edges of the circle would then have perfectly matched the pattern of stars surrounding the Pole Star, that is, a star would twinkle in each tiny notch in the jade. These templates varied with time because of the shifting positions of the stars. Although the date of this one has not been determined, similar ones have been dated to c. 100 BC and 600 BC. Unique to China, they were used to find orientations in the sky in the study of the constellations, and were among the earliest and most primitive equatorial astronomical instruments (Victoria and Albert Museum, London).

meridian in 125 AD, as well as one for the horizon. By that date, the true armillary sphere could be said to exist in its full form. But Chang Heng was not yet satisfied. He made non-observational armillary spheres rotate by water power, about 132 AD. He used a water wheel powered by a constant pressure-head of water in a clepsydra (water-clock mechanism) to rotate his sphere slowly. Here is a description in an official history:

Though many have discoursed upon the theory of the heavens, few have been as well acquainted with the principles of the *yin* and the *yang* as Chang Heng ... Chang Heng made his bronze armillary sphere and set it up in a closed chamber, where it rotated by the force of flowing water. Then, the order having been given for the doors to be shut, the observer in charge of it would call out to the watcher on the observatory platform, saying the sphere showed that such and such a star was just rising, or another star just culminating, or yet another star just setting. Everything was found to correspond with the phenomena like the two halves of a tally.

Another passage in the official history tells us

In the time of the emperor Shun Ti (126–144 AD) Chang Heng constructed a computational armillary, which included the inner and outer circles, the south and north celestial poles, the ecliptic and the equator, the twenty-four fortnightly periods, the stars within [i.e., north

of] and beyond [i.e., south of] the twenty-eight *hsiu*, and the paths of the sun, moon and five planets. The instrument was rotated by the water of a clepsydra [lit. dripping water] and was placed inside a closed chamber above a hall. The transits, risings and settings of the heavenly bodies shown on the instrument in the chamber corresponded with those in the actual heavens, following the motion of the trip-tug and the turning of the auspicious wheel.

This water-powered rotating instrument was a tremendous tool for demonstrating (and computing) the movements of the heavenly bodies. It must have given astronomers of the time a sense of intellectual power. Chang Heng is also said to have constructed one which was actually for observation of the stars, obviously not inside a chamber, which was also water-powered. However, full descriptions of it do not survive.

An astronomical instrument which is one step up on the armillary sphere is the torquetum, invented by the Arabs. With this instrument, all the various rings and so on are not nested together in a single sphere, but are mounted at various different parts of a set of struts, in a way more convenient and advanced than is allowed by the constraints of the single sphere. A non-equatorial form of the torquetum was transmitted by the Arabs to the Chinese. In Plate 18 (opposite) and Figure 3 (page 37) we see the great metal equatorial torquetum of the astronomer Kuo Shou-Ching of 1270, which was called the 'Simplified Instrument'. This was because it was made purely equatorial, and had all the Arab ecliptic components left out. We are fortunate that this



most instrument survives, for the Jesuits melted down most of the metal instruments in China as scrap. The top plate of this instrument measures 18 by 12 feet, the revolving meridian ring the centre is 6 feet across and the gong-tube is thus the height of a man.

Kuo had taken the torquetum of the Arabs and adapted it to the astronomical views of the Chinese. Needham says of this huge machine that it was one of the first of the equatorial mounting of telescopes and of Kuo's accomplishment.

Although Arabic influence may have been responsible for suggesting its construction, Kuo adapted it to the specific character of Chinese astronomy, namely equatorial coordinates. And in so doing, he fully anticipated the equatorial mounting so widely used for modern telescopes.

Needham believes that some knowledge of this reached Tycho Brahe in Denmark three centuries later and led to Brahe's taking up equatorial astronomy for his

instruments. As for the transmission of it to the West, China, Needham believes it came from the Arab to Gemma Frisius in 1534 and from him to Tycho Brahe. And through him and his successor Johannes Kepler modern European astronomy came to be equatorial in the Chinese manner. Since Kuo Shou-Ching is thirteenth century China, M.C. Johnson emphasizes that 'Actually our present day equatorial mounting has its origin in China'. He contrasts it on to an aspect of modern Western science which is barely appreciated.

Below: 18' Kuo Shou-Ching's famous Spherometer, No. 270 at the Purple Mountain Observatory at Nanking, seen from the East.

Nanking is due to the Ming Dynasty when it was appreciated that the difference of  $3^{\circ}$  in latitude rendered it a. At its original latitude the Pole Star would have appeared in a point required for the use of this equatorially inclined instrument in bronze and weighing several tons, the design was







created entirely out of its surrounding medium without the addition of any other distinguishing substance, and is therefore a perfect example of what the Chinese conceived all things to be: everything conceived from the Tao and dissolved back to the Tao—like a standing wave in a spouting bowl.

It is thus believed that Tao is the way of the Universe, which was always manifested from within rather than imposed from without, and standing outside the Universe. What is so utterly alien to all Chinese thought! The spirit parting up from matter, the Tao, is a form teased out of uniform and features fluid by the mysterious forces of resonance and sound—the cosmic forces which led to the creation and dissolution of all forms in that great sea—the Universe.

## CAST IRON FOURTH CENTURY BC

Blatant iron casting in China was known to have existed in Scandinavia by the late eighth century AD but many readers will be amazed to learn that cast iron was not used in China until the beginning of the 18th century. The Chinese were preoccupied to improve their cast-iron technology. What were the reasons? In North China, especially, there were no iron-bearing factors. China had good refractory clays for the construction of cast-iron stoves and furnaces. The

RIGHT: This cast-iron

pagoda is a masterpiece of Chinese iron casting. It was built in the 14th century and is now in the collection of the British Museum. The pagoda is made of cast iron and is a masterpiece of Chinese iron casting. It was built in the 14th century and is now in the collection of the British Museum.





Chinese also knew how to reduce the temperature at which the iron would melt. They threw in something which they called 'black earth' which contained much iron phosphate. If up to 6 per cent of phosphorus is added in this way to an iron mixture, it reduces the melting point from the normal 1130°C to 950°C. This technique was used in the early centuries, ceasing before the sixth century AD, when proper blast furnaces came into use which needed no such assistance.

Coal, which gave a high temperature, was used as a fuel from the fourth century AD, and probably earlier. One method was to put the iron ore in batteries of elongated tube-like crucibles, and pack these round with a mass of coal which was then burnt. This had the extra advantage of excluding sulphur from the process. As late as the seventeenth century, unsuccessful attempts were being made in England to use coal for smelting iron.

Cast iron was at first the preserve of private speculators, who grew rich from it. But the Han Dynasty nationalized all cast iron manufacture in 119 BC so that the emperor could monopolize it. At about that time there were forty-six imperial Iron-Casting Bureaux throughout the country where government officials supervised the mass-production of cast iron goods.

The widespread availability of cast iron in ancient China had many side effects. It led to the innovation of the cast iron ploughshare in agriculture, along with iron hoes and other tools. Iron knives, axes, chisels, saws and awls all became available. Food could be cooked in cast iron pots, and even toys were made of cast iron. Cast iron statuettes of various animals have been found in Han Dynasty tombs dating between the second centuries BC and AD. Cast iron moulds for implements dating from the fourth century BC have also been discovered. Hoes and axes would have been cast in these in either bronze or iron.

The expertise in cast iron enabled pots and pans to be made with very thin walls, impossible by other iron technology. One extremely important result was that salt could be mass-produced from evaporated brine, which can only be done in such thin pans. This in turn led the Chinese to exploit natural gas by deep drilling. This was in order to tap the energy from the burning gas to evaporate the vast quantities of brine required for the giant salt industry (which the Han Dynasty also nationalized

along with the iron industry in 119 BC). The salt and gas industries could not have existed without the cast iron industry.

In the third century BC, the Chinese discovered how to make a malleable cast iron by annealing (that is, by holding it at high temperature for a week or so). It was then not brittle and would therefore not shatter if subjected to a violent shock. This meant that objects like ploughshares could survive striking large stones with considerable force. Cast iron had something of the elasticity of wrought iron, but with the much greater strength and solidity that came from being cast. It was almost as good as steel.

Swords became 50 per cent longer when made in iron. In 28 BC a man named Chang Liang tried to assassinate the emperor using an iron mace which weighed 160 pounds. Perhaps it was too heavy for he did not succeed. Some of the ancient Chinese feats of casting iron are so impressive as to be almost unbelievable, even when the results are before our eyes. For instance, there is a cast iron



ABOVE 2 The *Great Wall* is a single piece of cast iron from ancient China and still one of the largest such objects in the world: the Great Wall of Tsang-chou in Hopei Province erected in the year 954 by the Emperor Shih Tsung in commemoration of his campaign against the Liao Tartars. It weighs about 40 tons and stands 20 feet high and 16 feet long. It is not solid: its thickness varies from 8 inches to only 10 inches in places. The sections were poured at different times but some of the joints between them are weak. This giant object was made more than four hundred years before any cast iron was to be available in Europe.

pagoda seen in Plate 20 (page 44). This fantastic structure can be precisely dated to the year 1105. It is 78 feet high, cast storey by storey. There are several other such iron pagodas.

But these were by no means the biggest cast-iron buildings made by the Chinese. The largest seems to have been the temple built on the orders of the Empress Wu Tse in 688 AD. This building, which no longer survives, was a staggering 294 feet high, based on an area of about 300 square feet. It was in the form of a three-storey pagoda, and atop the structure was a 10-foot cast-iron phoenix covered in gold plate.

Perhaps the grandest cast-iron structure of all was not actually a building. The Empress Wu Tse had an octagonal cast-iron column built, called the 'Celestial Axis Commemorating the Virtue of the Great Chou Dynasty with Its Myriad Regions'. It was built in 695 AD upon a base of cast-iron 170 feet in circumference and 20 feet high. The column itself was 12 feet in diameter and rose 105 feet in the air; on top was a 'cloud canopy' 10 feet high and 30 feet in circumference. On top of this in turn stood four bronze dragons, each 12 feet high, supporting a gilded pearl. We have a record of the amount of metal used in this construction — 2,000,000 *catties*, which is about 1325 tons. The largest single cast-iron object ever made (the pagodas were obviously not a single piece) was erected on the orders of the Emperor Shih Tsung of the Later Chou Dynasty in commemoration of his campaign against the Tartars in 954 AD. This extraordinary object, 20 feet tall, still stands and is known as the Great Lion of Tsang-chow. It is not solid, but its walls vary from 1½ to 8 inches in thickness. It is reproduced in Plate 21 (page 45).

## THE DOUBLE-ACTING PISTON BELLOWS

THE CHINESE INVENTION

The double-acting piston bellows was a pump for air or fluids which enabled a continuous stream to be expelled. It was the capacity to provide continuous blasts of air which was a crucial factor in enabling the Chinese to achieve their superiority in metalurgy for so many hundreds of years. We do not know who invented the double-acting piston bellows, or exactly when it appeared. But it seems to have been

widespread by the fourth century BC, so that we can probably safely place its invention in the fifth at least. It appears to be referred to in the great philosophical classic of Lao Tzu as follows:

Heaven and Earth and all that lies between,  
Is like a bellows with its tuyere [nozzle  
for the blast],  
Although it is empty it does not collapse,  
And the more it is worked the more  
it gives forth.

The most conservative estimate dates Lao Tzu's book to about the fourth century BC, though the traditional dating is the sixth. Either could be correct. The third line is the crucial one, since it seems to refer to the continuous action of the double-acting piston bellows, which is a bellows that indeed does not collapse.

We see a double-acting piston bellows in Plate 22 (below), and in Figure 4 (opposite) we see a diagram of how it works. It is really a most simple but ingenious invention. A piston is pushed in and pulled out of a rectangular box, which acts as a cylinder. Feathers or folded pieces of soft paper are wedged round the piston to make sure that it is both airtight and lubricated in its passage. (These are the ancestors of modern piston-rings.) There is an inlet valve at each end of the box. When the piston is being pulled, air is sucked in from the far end. When

PLATE 22. A fourteenth-century painting showing a portable double-acting piston bellows in use by a travelling linker (Victoria and Albert Museum, London).



it is being pushed air is sucked in from the near side (See 'A' and 'B' in the diagram) in both inward and outward strokes, air is sucked into the cylinder; and in both cases air in the portion being compressed (that on the other side of the piston) is pushed into a side chamber where it is then expelled through the tuyère, or nozzle. The device is so simple that it is difficult to understand why Westerners never invented it (It could provide blasts not only of air but of liquids, and an example of the latter is given in the account of the flame-thrower, page 254).

The earliest published pictures of double-acting piston bellows are found in a quaint book of 1280 entitled *Book of Physiognomical, Astronomical and Ornatuonamic Divination according to the Three Schools*.

In the West in ancient times, single-acting pumps were certainly known from at least the second century



ADJOVE FIG. 4) A run-away diagram of the double-acting piston bellows. A lengthwise section shows the piston being pulled out (left) thus compressing the air within the right-hand chamber and forcing it out of the nozzle at the bottom. When the piston is pushed in again air is compressed in the chamber at the left and is forced from the nozzle once more. The feathers shown are used to indicate the movement of the piston while at the same time scaling off the air around its edges. The bellows is double-acting; either the piston is being pushed or pulled it compresses air in alternate chambers, so that it pushes continuously from the nozzle. The nozzle has a valve like a swinging door which here is seen pushed to the left on the in-stroke of the piston it swings back to the right.







...the ...  
...the ...  
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and syringes go back to indistinct antiquity, have been used for embalming in Egypt. But the first pumps which ejected air or liquid on the outward stroke. The double-acting air bellows reached Europe, presumably from China, in about the sixteenth century. In 1716 J.N. de la Hire turned the principle over to liquid for the first time in the West in a double-acting water pump.

## THE CRANK HANDLE

If a wheel is turned, which is not mounted in place for some mechanical purpose, then it is silly just to push the wheel round. The obvious thing to do is to stick a rod into the side of the wheel, use that as a handle, and turn it. This is known as a crank handle. But no one ever thought of it until the Chinese did in the second century.

The Chinese invention of the crank handle was for use on their rotary winnowing machine (page 24). It was used in agriculture. (A winnowing machine with a crank handle may be seen in Plate 1, page 24.) It was only then that sticking a rod at right angles into the side of a wheel was seen to be a useful way of turning the wheel. Not for eleven hundred years would the same idea occur to Westerners.

The only other people who came close to the invention of the crank handle were the ancient Egyptians. They had a kind of lever, a photo-copied version of the one used for a primitive hand drill. It featured a slanted handle at the top for turning, but was not attached to a wheel, nor was it at right angles.

The Chinese used the crank also on water windlasses, querns, mills and the many machines used in the silk industry. The earliest published picture of a crank handle appeared in Wang Chen's *Treatise on the Crank* in 13. But the oldest surviving depiction of a crank handle is on a miniature pottery vessel of





**ABOVE (24)** A glazed pottery model of a farmyard from the first century BC, during the early Han Dynasty. A dog sits in the foreground. In the wall on the left there is an open chute (the opening for a rotary winnowing fan). Below the chute a crank handle is used to operate the winnowing fan protruding from the side of the wall. Crank handles were not known in Europe before the ninth century AD. Nelson-Atkins Museum of Art, Kansas City, Missouri.

model found in a Han Dynasty tomb, dating from about the first century BC (see Plate 24 (above)). The oldest European evidence for the crank handle is a picture of one on a rotary grindstone in the Utrecht Psalter, a manuscript of about 830 AD.

## THE 'CARDAN SUSPENSION', OR GIMBALS

The 'Cardan suspension', or gimbals, takes its usual name from Jerome Cardan (Girolamo Cardano, 1501-76, who is also mentioned in the section on mathematics (pages 155-6). But Cardan neither invented the device nor claimed to have done so. He merely described it in his very popular book *De Subtilitate* (1550). The gimbals appeared in Europe as early as the ninth century AD, but it was invented in China by the second century BC at the latest.

This invention is the basis of the modern gyroscope, making possible the navigation and 'automatic pilots'

taken for granted in modern aircraft. Anyone who has been fortunate to enter a nineteenth-century gypsy caravan will have noticed affixed to the walls the brass gimballs that hold lamps which remain upright no matter how violently the cart may jolt on the road. These interlocking brass rings can be moved around as much as you like, but the lamp suspended in the centre never turns over. This is the basic idea of the 'Cardan suspension'. A series of rings inside one another are each joined at two opposing points, enabling them to twist and turn freely. Consequently, if a heavy weight, such as a lamp, is positioned upright in the centre, it will remain upright. Whatever motions might occur to the rings around it will be taken up by the rings themselves, leaving the lamp unmoved. By the eighteenth century, Chinese mariners were using a gimbal-mounted compass. A ship's magnetic compass mounted in this way was free of disturbance by waves.

The earliest textual reference to the gimbals, which has been found, is in a poem called *Ode on Beautiful Women*, composed about 140 BC, by Sima

Hsiang Ju. It describes a seduction scene, and among the bedclothes, hangings, furniture and so on, the poet mentions the metal rings containing the burning perfume. The supposed inventor of the gimballs was Fang Feng, though his identity is uncertain. More than three centuries later about 189 AD, the clever mechanic Ting Huan was given credit for inventing the gimball as a second time. A book called *Miscellaneous Records of the Western Capital* records

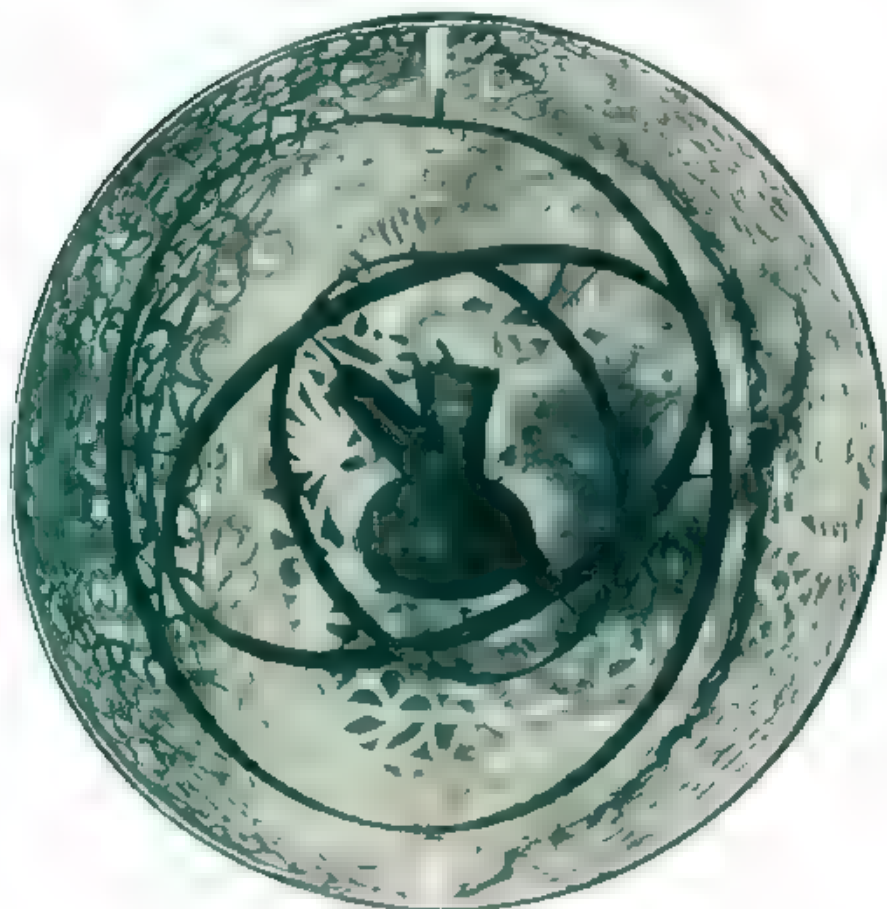
Ting Huan also made a 'Perfume burner for use among Cushions', otherwise known as the 'Bedclothes Censer'. Originally such devices had been connected with Fang Feng but afterwards the method had been lost until Ting Huan again began to make them. He fashioned a contrivance of rings which could revolve [in all three dimensions], so that the body of the burner remained constantly level, and could be placed among bedclothes and cushions. So it was given the name of Bedclothes Censer.

Ting Huan was connected also with the invention of the zoetrope, or 'magic lantern' (see page 98).

The gimball as turns up throughout Chinese literature after this point. In 692 AD the Empress Wu Hou was presented with wooden warming stoves which, though rolled over and over with their iron cups filled with glowing fuel, could never be upset. A book of 1734 called *Topography of the West Lake Region of Hangchow* mentions that 'interlocking pivots' were mounted inside paper lanterns which were then kicked and rolled along the streets without the lamps inside being put out. They were known as rolling lamps.

The various gimball constructions had over the centuries such colourful names as perfume balls, globe lamps, silver bags, rolling spheres and perfume baskets, and they were regularly used in annual processions as symbols of the moon carried in front of an undulating dragon (see Plate 26 (page 52)).

The gimball reached Europe after eleven hundred years. And eight hundred years after that, the famous



LEFT 25) A Photograph of the interior of a brass Tibetan globe lamp. The lamp is suspended by three interlocking rings, which always hold it upright whichever way the lamp turns, even if it is upside-down. The outer cover is decorative and protects the inner tube and the lamp holds a candle and in place of the wick it would originally have had. The use of interlocking rings to hold something upright in the centre is often called Cardan suspension, after Jerome Cardan a sixteenth-century Italian astronomer. The Chinese invention predates him by seventeen hundred years. (Collector of Dr Joseph Needham.)





OP. 435. 1E (77) A lacquer screen with a decorative frieze showing children taking part in a dragon procession. One child holds a globe with a replica of the Moon-pearl in front of the dragon. Within the paper globe were three little figures, upright, by a gimbals, and bamboo rings, so that with a clever way, the tiny dancer did jump would not be as impossible. Collection of Dr. Lo Guen-fu.

scientist Robert Hooke and others adopted its principle in a new form, applying power from without rather than stabilizing a central element within to formulate that Western invention, the universal joint. And it was this invention which resulted in the transmission of automotive power in contemporary motor cars. Perhaps today, as we drive, we should give a thought to how much we owe to that most unlikely of all sources of mechanical progress in mass transportation, the 'perfume burner for use among cushions'.

## MANUFACTURE OF STEEL FROM CAST IRON

Since the Chinese were the first to produce cast iron, they were also the first to make steel from cast iron. This was fully under way by the second century BC at the latest, and eventually led to the invention of the Bessemer steel process in the West in 1856. Henry Bessemer's work had been anticipated in 1852 by William Kelly, from a small town near Eddyville, Kentucky. Kelly had brought four Chinese steel experts to Kentucky in 1845 from whom he had learned the principles of steel production used in China for over two thousand years previously, and had made his own developments.

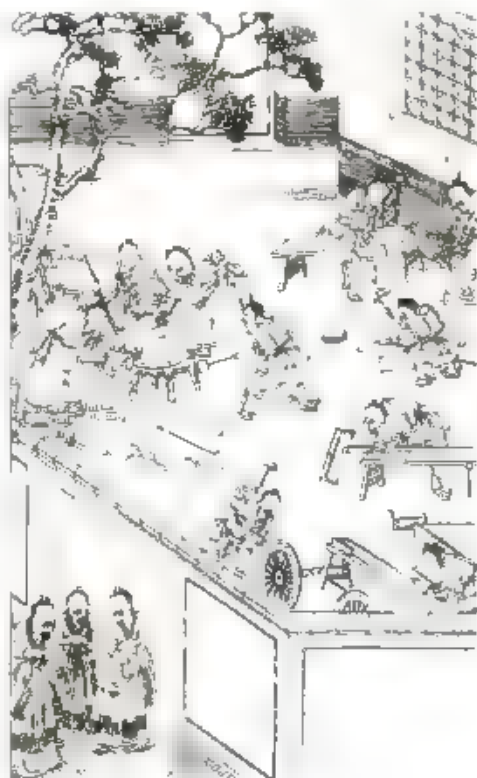
Iron when melted and reformed into ingots, has a carbon content. This determines the nature of the metal as cast iron or steel, whichever the case may be. Cast iron is brittle because it contains a considerable quantity of carbon, perhaps as much as + 5 per cent. Decarburization is the removal of some or all of this carbon. Remove much of the carbon and you have steel, remove nearly all the carbon and you have wrought iron. The Chinese used wrought iron a great deal, most notably perhaps in building large bridges and aqueducts.

The Chinese invented the suspension bridge (see page 64), often constructing such bridges with chains

whose links were of wrought iron instead of plaited bamboo. Cast iron was called 'raw iron', steel was called 'great iron', and wrought iron was called 'ripe iron' by the Chinese. In order to make iron 'ripe', they clearly understood that the iron was losing a key ingredient, and they described this as 'loss of vital juices'. But, without knowledge of modern chemistry, they could not identify the ingredient as carbon.

The Chinese were not the first to make steel. But they did invent two particular steel manufacturing processes, of which taking the carbon out of cast iron was the first (the second is described on page 76). The first, the process of 'decarburization', was accomplished by blowing oxygen onto the cast iron ('oxygenation'). We read of this in the classic *Hsun-Nan Tzu*, which dates from about 120 BC.

Making steel by this means was also called 'the hundred refinings method', since it was often done over and over again, the steel becoming stronger each time. Swords made by this method were highly prized. The back of the sword, not having an edge



ABOVE (27) A traditional Chinese print showing artisans at work in the Imperial Workshops. Those on the left are forging a sword on an anvil.





would often be made of the more elastic wrought iron, and the harder steel would be welded onto it to bear the cutting edge for a sabre. The carbon content of the steel could be adjusted depending upon how much oxygen was applied to the molten iron.

Generally speaking, steel with a higher carbon content is stronger, but then strength is traded against brittleness. Steel can have a carbon content of between 0.1 per cent and 1.8 per cent. The Chinese could only make empirical judgements on the qualities of steel obtained from certain numbers of refinings. If very soft steel was desired, they could go on blowing more oxygen in, removing increasing amounts of the carbon. And they practised the world-wide technique of quenching whereby steel that is cooled instantly in a liquid when still either red- or white-hot preserves its inner metallic micro-structure which it would lose if allowed to cool slowly. On the other hand, cooling steel slowly (tempering) has other advantages. The Chinese were great masters at manipulating their iron materials in countless different ways to obtain the exact type of metal they required. In iron and steel technology, they led the world until modern times. And they were the first to make steel by taking the carbon out of cast iron. But then, no one else could have done so at the time, since cast iron existed nowhere else but in China.

## DEEP DRILLING FOR NATURAL GAS

PERKINS KOBAYASHI

The Chinese originated deep drilling by the first century BC and, with their traditional methods, were able to drill boreholes up to 4800 feet deep. The deep drilling for today's supplies of oil and natural gas is a development from these Chinese techniques.

The primary motive for deep drilling in China was the search for salt. Even as recently as 1965, 16.5 per cent of China's salt supplies came from brine pumped out of deep boreholes, making this source of supply second only to sea salt. In the beginning, the deep boreholes yielding brine were presumably artesian wells, with the brine spouting out of the wells under natural pressure. But, later, highly sophisticated methods of extracting the brine were developed for wells which had no artesian pressure. If the drilling went below the brine level, there would be vast supplies of natural gas, which was primarily methane. So the drilling for natural gas followed close on the

heels of the drilling for brine and essentially developed at the same time.

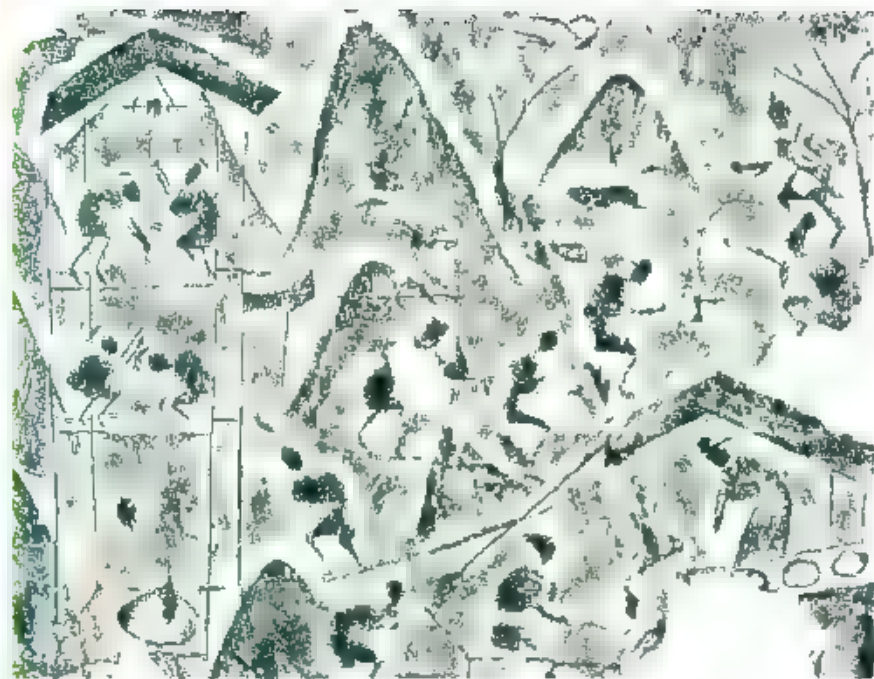
The sheer size of Chinese drilling equipment was remarkable. Derricks could rise as much as 80 feet above ground. One huge derrick photographed at the turn of the century may be seen in Plate 30 (see page 58). Tubes for extracting brine could be as much as 130 feet long and were inserted down the boreholes. At the top of a borehole would be a shaft dug with spades, reaching down to the level of hard rock, whether this was one foot or dozens of feet down. Once the rock was reached, stones with holes through the middle were stacked one on top of another up to ground level, all perfectly centred so that a long hole 8 to 14 inches wide extended down through them all from ground level to rock level. Then, the drilling would begin. A drill would be suspended by bamboo cables from a derrick. Thanks to the advanced state of the iron industry in China (see the account of the invention of cast iron, page 44), cast-iron drilling bits were available. These would be dropped onto the rock, and any depth from 1 inch to 3 feet a day might be drilled. The drilling of a truly deep borehole often took years. The only power used for drilling was manpower: men jumped onto a lever to raise the bit and jumped off to let it crash down again. They did this rhythmically for hours on end.

The bamboo cables were made of strips 40 feet long. A single-strength cable would be used down to 1500 feet, but at depths greater than that, the cable was of double thickness. The tensile strength of hemp rope is 750 pounds per square inch, whereas that of bamboo is nearly 4 tons per square inch, equal to some steel wire. The bamboo was also so flexible that it could easily be wound up round the borehead winding drum. Bamboo cables had the added advantage of becoming tougher when wet, the opposite of rope.

It has been remarked that because Europe had no material equivalent to bamboo, and because using hemp ropes as cables for drill bits would have been like drilling with a rubber ball on the end of a piece of elastic, Europeans could not have developed deep-cable-drilling techniques even if they had wanted to.

When drilling commenced for the day, the cable was lowered by hand very gently until a slight tremor indicated that the bottom had been reached. The cable could not be at all slack, so that even if the drill bit were thousands of feet down, the drilling foreman could adjust its height by inches using a device called





LEFT 39) A rubbing, from a Chinese tomb of about the first century AD. On the left may be seen a derrick for deep drilling, for brine deposits four stories high, hoisting up a bucket full of brine, within the three-storey derrick, while another bucket rests in the background is a furnace.

a 'pounding regulator', which manipulates a 'loop' made at the top of the drilling cable. Two kinds of bit were traditionally used. The larger was 10 feet long and weighed over 300 pounds. It was used to pound the rock and widen the hole made by the smaller bit. The smaller bit weighed only a few dozen pounds.

Large numbers of men were not needed to do the drilling. Shallow wells needed only two men to jump on the lever board, whereas four to six men sufficed for deep wells. With a typical 12-foot lever, the bit would be raised to a height of about 20 feet, and then let fall. But lest the hole not be even and round, a worker stationed at the mouth of the well twisted the cable at each drop so that the drill bit would strike at a slightly different angle each time. By rotating the bit in this way, an even hole was produced.

Extremely ingenious devices were developed for fishing out of boreholes anything that might get stuck or tangled. These things would be dealt with thousands of feet underground with relative ease. Other devices were invented called 'jars', which prevented the jarring of the derrick and platform every time the drill hit the rock.

The detritus left from several successive drill smashes would be removed by suction through hollow bamboo tubes with leather valves at the end, the pumps derived from the double-acting piston bellows described on page 46. The rock chips would

either be mixed with water poured down the well (in the early stages of drilling) or would mix naturally with water which was seeping into the borehole, so that the rubble would be brought up as slush.

The boreholes were lined with bamboo tubing. These had male-female joints and were watertight. Water seepage was thus prevented when drilling, except at the bottom. And when brine was reached, the brine could thus be extracted without being diluted by seeping fresh water from higher levels. When extracted from the wells, the brine would be raised several feet above ground level and was distributed for miles all round in an elaborate network of bamboo piping. Huge cast iron evaporation pans were set up, into which the brine would be poured. Heat would be applied under the pans, and the brine vigorously boiled for long periods. So vast was the amount of salt produced by this enormous industry that the province of Szechuan, known anciently as Shu, enjoyed several periods of independence from central government on the basis of its self-sufficiency in deep-borehole salt supplies.

Although the salt was sometimes evaporated by fires burning either wood or coal, this was a more expensive way than using natural gas fires. It was cleverer to use the natural gas from the same borehole or an adjoining one to heat the pans, and as many as 5100 salt pans are reported to have been heated by the

natural gas from a single well (the details of the use of natural gas as a fuel are recounted on page 89)

How many and how deep were the Chinese boreholes, whether for brine or for natural gas? Brine could not be found at less than 100 feet deep, and most of the boreholes had to be sunk to at least 600 feet. The majority of them went to depths averaging 3000 feet and the deepest recorded went to 4800 feet. There are more recent boreholes to 9600 feet but we cannot be certain whether any of these deeper wells were drilled entirely by the traditional drilling technology or were assisted by imported Western technology, so the claims for the traditional drilling technology stop at a conservative 4800 feet.

As for the numbers of deep boreholes, there were hundreds of them. An imperial edict of 1089 limited the number of them in the prefecture and province of Ch'engtu alone to 160 wells. An earlier tally said that in six districts of Tzu-chou there were 157 wells in working order and 50 plugged by government officials as a penalty for tax evasion. The salt industry was supposed to have been nationalized in the second century, but entrepreneurs continually tried to conceal their wells by removing the derricks before government inspectors came along. And without signs on the surface, who is going to spot a hole a few inches across with a stone placed over it, even if it does extend downwards 3000 feet? But the government 'revenueurs' were as assiduous in hunting down bootlegging brine drillers as their counterparts have been in modern times in looking for illicit stills of moonshine whisky in the Appalachian Mountains of Kentucky and Virginia.

One hotbed of tax evasion in the eleventh century was the district of Pei-ch'ing, where, out of 50

boreholes, 45 were plugged by 'revenueurs' who found them out. In 1095 a complaint to the emperor said: 'In the prefecture and province of Ch'engtu all the brine boreholes are plugged up, and because of their closure thousands of families are unemployed.'

The first information in Europe about Chinese drilling techniques seems to have arrived in garbled form in the seventeenth century through Dutch informants. But the first full description of the Chinese system sent to Europe was in the form of letters written in 1628 by a French missionary named Lambert. His account was discussed in 1829 by an Englishman at the French scientific society, Lambert then wrote another letter giving further details and insisting that it was indeed possible to drill deep holes with bamboo cables (Europeans had been attempting boreholes with linked rods, which were not working very well). Lambert said he had seen, with his own eye, great wheels drawing up tubular buckets of brine, the wheels measured 40 feet in circumference and were turned fifty times, showing that depths of 2000 feet

Figure 1  
A traditional Chinese  
drilling rig, showing the  
derrick and the  
bamboo cables used for  
drilling.

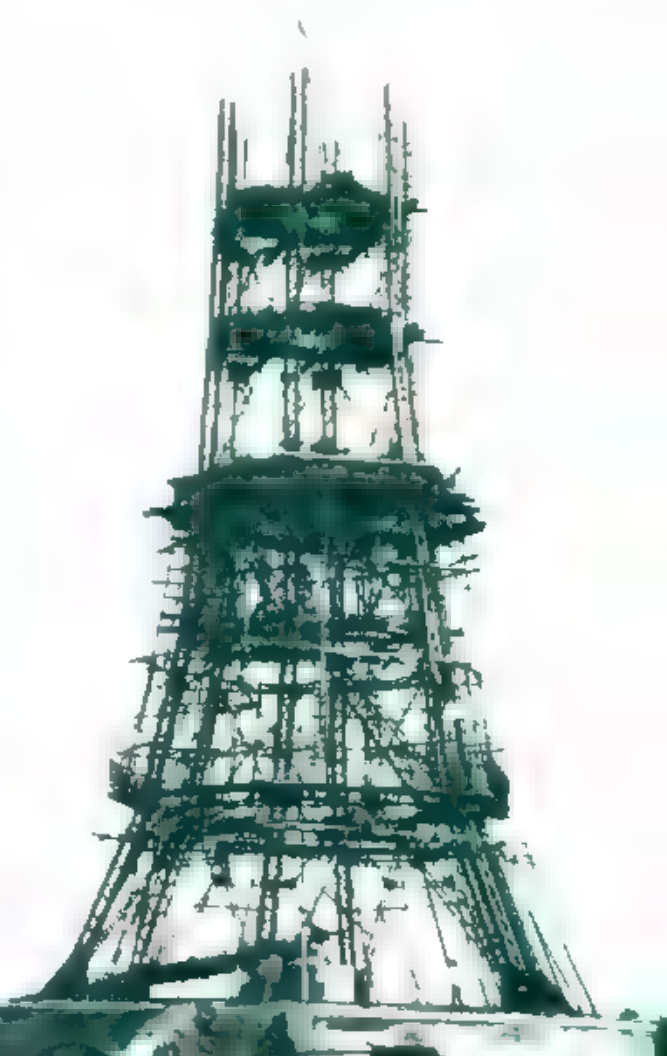




Figure 1. A photograph of a traditional Chinese oil drilling rig, showing the complex wooden structure and the use of ropes and pulleys for lifting and lowering the drill bit.

could indeed be reached. A French engineer, Jubard, had tried the Chinese method as soon as his first party had arrived. Various details of the Chinese system were also adapted for bucket-and-drilling, bringing greater success.

By 1834 Chinese drilling techniques had become primarily established in Europe for bucket drilling and by 1841 for bucket drilling. In 1859 a well exclusively for oil was drilled at Oil Creek, Pennsylvania, by Colonel E. L. Drake using the Chinese bucket method. The oil was to be used for fuel, as had been the case in China for some time (see page 83). Drake and similar oil drillers in America may have obtained knowledge of the system not from Europe but from the thousands of Chinese indentured labourers used to build the railways in nineteenth-century America. In America the method for oil drilling prior to the advent of steam power, known as *bucket-and-drilling*, as it was called, was exactly the same as the Chinese technique of bowstring drilling, which had derived from the men jumping on

and off a lever. And even the modern rotary system to have partly Chinese ancestry. In short, Western deep drilling was essentially an importation from China, and the modern oil industry is owed its crucial technique, which in turn led to the advance of the West.

## THE BELT-DRIVE (OR DRIVING-BELT)

The belt-drive or driving belt transmits power from one wheel to another, and produces continuous rotary motion. It existed as early as the first century BC in China. It is attested by a passage in Ying Hsiang's book *The Great Idea* (c. 150). It was developed for use in machines connected with silk manufacture, especially one called a quilling-machine, which wound the long silk fibres onto bobbins for the weavers' shuttles. These machines featured a large











Figure 1-10. A chain pump, a water-lifting device, from the Song Dynasty (11th century).

## THE CHAIN PUMP

With a total length of 100 meters, the pump was built by the famous engineer Shi Ping, who was a native of the Song Dynasty. The pump was built in the year 1087, and it was the first of its kind in the world. It was a chain pump, and it was used to lift water from the Yellow River to the city of Kaifeng.

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He further asked Pi Lan to construct square-pallet chain pumps and suction pumps, which were set up to the west of the bridge outside the Peace Gate to spray water along the north-south roads of the city, thus saving the expense incurred by the common people [in sprinkling water on these roads and carrying water to the people living along them].

Chain pumps had achieved a standard form in China by 828. The imperial history for that year records

In the second year of the T'ai-Ho reign-period, in the second month . a standard model of the chain-pump was issued from the palace, and the people of Chung-chao Fu were ordered by the Emperor to make a considerable number of the machines, for distribution along the Cheng Pa Canal, for irrigation purposes.

The pumps were used for civil engineering works and for draining all sorts of sites, as well as for irrigation and the supply of drinking water. The pumps were so spectacular in their results that visiting dignitaries and ambassadors from neighbouring lands eventually adopted them in their own countries. By medieval times, Korea and Annam (Vietnam) had transformed their agriculture and irrigation by this means. In 1221, when the pumps were introduced by some visiting Chinese to the inhabitants of Turkestan, the locals exclaimed with delight, 'You Chinese are so clever at everything.'

The first European square-pallet chain pumps were made in the sixteenth century modelled directly on Chinese designs. By the end of the next century, the British Navy had copied them from Chinese

junks for use as barge-pumps aboard ship. The pumps were introduced to America by the Dutchman A. E. van Braam Houckgeest, where he said they had 'proved of great utility.' And the conveyor-belt form was adapted for use in the eighteenth century by Oliver Evans for flour-milling. This led to the development of the modern grain-elevator. A sixteenth-century European dredger using buckets instead of pallets is the ancestor of all the drainage devices on belt conveyors used in modern mining and excavation work. And as recently as 1938, the classic square-pallet chain pump was reintroduced to the United States from China for pumping crystallized brine from the Great Salt Lake in Utah.

## THE SUSPENSION BRIDGE

[illegible]

Few structures seem more typical of the modern world and its engineering achievements than the suspension bridge. And yet, the sophisticated form of the suspension bridge with a flat roadway suspended from cables, was unquestionably invented in China. And it is highly likely that the two more primitive forms of suspension bridge also originated there: the simple rope bridge and the catenary bridge (where the walkway or roadway is not flat but follows the curve of the cables).

The simplest form of 'suspension' bridge – if we can even call it that – is simply a rope thrown across a gorge. Probably from the very beginning the technique used for getting the rope across was that still used later for elaborate suspension bridges – shooting it across, tied to an arrow. After the Chinese invention of the crossbow (see page 244) greater power would have been available for heavier cables over long distances.

Climbing or scrambling along a single rope above a gorge can be dangerous, and is hard on the hands. An ingenious solution is still in use in some areas, such as the Tibetan-Chinese border. The rope is threaded through a hollow piece of bamboo before being attached, and the person merely hugs the bamboo and slides along the rope without burning his hands or straining himself unduly. A more sophisticated method is by a cradle attached to the bamboo tube. Cable bridges of liana vines are known in the Andes mountains of Peru, dating back to at least 290, and Needham suspects that this may be one of the many

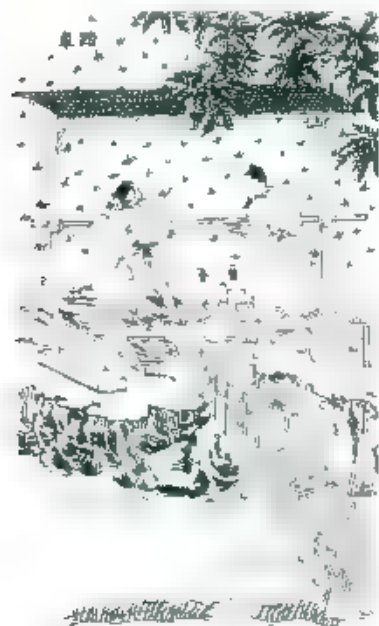


FIGURE 34 A woodcut printed in *Explication of the Marks of Asurie* in 1537 showing two men working a square-pallet chain pump by hand.





A view of the San-ch'ih p'an gorge, where the road is only 16 or 17 inches wide, on the edge of unfathomable precipices. Travellers go stop by step here, clasping each other for safety, and rope suspension bridges are stretched across the chasms from side to side. After 20 li one reaches the Hsien-tu mountain pass. Verily the difficulties and dangers of the road are indescribable.

...dair... v... p... with New World... the Pacific.

Bridges of ropes and cables in China and Tibet evolved into multiple-cable bridges of various types. Sometimes three ropes or cables are stretched across together so that the person crossing can walk with his feet on two of them and hold a third above his head for balance. Cross-ropes, known as *ch'iao-ch'iao*, are incorporated between the two bottom ropes or cables to make the going easier. Another variation is to have a series of hanging straps by which the user pulls himself forward. All these and other variations occur in the area between China and Tibet, in the high mountains. A reference in the Chinese text (see bibliography for 90 A) appears to mention a suspension bridge which has planking and, hence, a proper path for the crossing.

There the gorges and ravines allow of no connecting road, but ropes and cables are stretched across from side to side and by means of these a passage is effected.

The road is very narrow. The bridge is made of ropes and cables. The road is very narrow. The bridge is made of ropes and cables.

Then comes the road through the San-ch'ih p'an gorge, thirty li long, where the path is only 16 or 17 inches wide, on the edge of unfathomable precipices. Travellers go stop by step here, clasping each other for safety, and rope suspension bridges are stretched across the chasms from side to side. After 20 li one reaches the Hsien-tu mountain pass. Verily the difficulties and dangers of the road are indescribable.

From Hsien the first Chinese Buddhist pilgrim recorded this very bridge in 399 AD and left the account of his experience.

Keeping on through the valleys and passes of the Ts'ung ling mountain range, we travelled south-westwards for fifteen days. The road is





ABOVE This relatively primitive suspension bridge is still in use in Wolaita in modern times.

difficult and broken, with steep crags and precipices in the way. The mountain sides are simply stone walls standing straight up 8000 feet high. To look down makes one dizzy, and when one wants to move forward one is not sure of one's foothold. Below flows the Hsin-t'ou Ho. Men of former times bored through the rocks here to make a way, and fixed ladders at the sides of the cliffs, seven hundred of which one has to negotiate. Then one passes fearfully across a bridge of suspended cables to cross the river, the sides of which are here rather less than 80 paces [400 feet] apart.

Cable bridges in China were most efficient when made of bamboo. The cables were made with a center formed of the core of the bamboo surrounded by painted bamboo strips made of the outer layers of the wood. The plating was done so that the higher the tens on, the more tightly the outer strips gripped the

inner core. This led to the safety factor that it is the inner strands of a cable which snap first, rather than the outer strips which would otherwise unravel very fast. An ordinary 2-inch hemp rope can stand stresses of only about 8000 pounds per square inch, but bamboo cables can stand a stress of 26,000 pounds per square inch. Ordinary steel cables will only take twice as much stress (56,000 pounds), so bamboo is remarkably strong. (Modern steel alloys such as used in the Golden Gate Bridge at San Francisco can take stresses of 256,000 pounds per square inch.)

The most famous Chinese suspension bridge is a catenary bridge (with flat roadway following the curves of the cables rather than hanging flat) the An-lan Bridge at Kuanhsien in Szechuan. It has a total length of 1050 feet, composed of eight successive spans and there is not a single piece of metal in the entire structure. An account of a traveller crossing it in 1177 describes only five spans at that time. It has planking on which to walk, originally 12 feet wide but today only 9 feet wide and it is believed to have

RIGHT 371 A previously unpublished photograph of the famous An-lan bridge at Kuanhsien in the southern province of Szechuan taken by Frank Liners in 1938 at age 17. It is composed of eight successive spans. This catenary bridge has a total length of 1050 feet. The platform is wood planking and the cables





been built in the third century AD by Li Ping. It may be seen in Plate 37 (opposite).

The true suspension bridge became possible with the invention of the iron-chain suspension technique. As described elsewhere (page 53) the Chinese were in advance of the whole of the rest of the world in their iron and steel technology. Needham believes that they applied wrought-iron chains to suspension bridges by the first century AD. Massive stone abutments were built to anchor the chain ends.

From these chains it became possible to suspend the planking gangway increasingly away from the catenary curve of the chains themselves so that it tended towards being a flat surface. The greatest span of which a Chinese iron-chain suspension bridge is known to have been capable is about 430 feet, at Lu-shan in Szechuan. The longest such bridge which still exists is 361 feet, at Lu-tung in Szechuan. Its chains are embedded 40 feet deep into the stone pillars on both sides. The bridge may be seen in Plate 35 (page 65). It is present for it was built in 1765, but it is presumed to have replaced earlier versions on the same site. It was the scene of a major incident during the Communist Army's Long March when they successfully stormed the bridge under heavy fire despite the fact that its planking had largely been removed.

We have an interesting and vivid description written in 1638 by Hsu Hsia-K'o of a bridge in south-western Kweichow Province.

The P'an Chuan bridge is held by iron chains which connect the cliffs on the eastern and western sides of the river, a distance of 150 feet. The warp so made has a web of planks. The cliffs themselves are about 300 feet high and between them a swift raging stream of water, of unfathomed depth, rushed along. In earlier years ferry boats were often in grave danger of capsizing, whereupon people tried to span it by a stone structure, but they failed. Then in the fourth year of the Ch'ung-Chen reign-period the present Governor, then a judge, Chu Chia-Min, asked Major Li Fang-Hsien to build a suspension bridge. So now several tens of great iron chains are suspended from towers on each bank, and on them two layers of boards, about 8 inches thick and more than 8 feet long, are laid. The bridge looks flimsy and unsubstantial, but when people tread on it, it is as immovable as a mountain-

peak, daily hundreds of oxen and horses with heavy loads pass over it. Each side of the bridge is protected by a high iron railing woven with smaller chains. On each bank there crouch two stone lions, 3 or 4 feet high, which clench these railing-chains tightly in their mouths.

An old engraving of this bridge was published in 1665 in *Record of the Iron Suspension Bridge* by Chu Hsieh-Yuan. In the foreground is the stone of weeping—a memorial to all those who lost their lives trying to cross the river before the bridge was built in 1629. This bridge remained in service until 1939, when it was replaced with a steel suspension bridge, destroyed by the Japanese only a year later. In 1943 a new steel suspension bridge was erected half a mile downstream which is still in use.

Chinese regions tend to have different types of bridge. Suspension bridges are found mostly in the south-west of China. Arch bridges (see page 77) are found mostly in the north. Only those who travel into the wilder and more remote parts of south-western China are likely to see the ancient suspension bridges which still exist there in profusion. Since the origins of suspension bridges are somewhat vague, with no precise date and no actual inventor, we may take the date of the first century AD, when iron chains were applied to bridges as a highly conservative date for the earliest Chinese suspension bridges capable of carrying vehicles (though probably this happened at least four centuries earlier, using only bamboo cables, at Kuanhsien).

The first Western suspension bridge capable of carrying vehicles was built in 1809 across the Merrimack River in Massachusetts (span 244 feet). In the case of this invention we can trace its transmission fairly well. The suspension bridges of Kweichow, such as the P'an Chuan Bridge just described, came to the attention of the Jesuits and other Westerners who visited China in the seventeenth century. In 1655, Martin Martini described an iron-chain bridge over a river in Kweichow, which was incorporated in Blaeu's great *New Chinese Atlas* of that date.

An earlier mention of suspension bridges seems to have reached the European designer Faustus Verantius, for he proposed a sort of suspension bridge of linked rods in 1595. The Chinese also had such bridges of linked rods. But it was Martini's remarks which brought wide attention to suspension bridges in

Europe. The subject was picked up two years later, in 1667 by Athanasius Kircher, in his *China Illustrata*. Kircher wrote:

When several people cross the bridge at one time it moves and sways and oscillates up and down in such a way as to evoke in them no small fear of the danger of falling off, yet I find it impossible sufficiently to admire the skill of the Chinese engineers, who have executed so many and such arduous works for the greater convenience of wayfaring men.

However, European engineers seem to have done nothing about this for nearly a century. Then the first Western iron-chain suspension bridge, the Winch Bridge, was built in 1741 over the Tees in England. It had only the cables, and no deck for vehicles. The same was true of some small bridges which were built about that time. But since the first Western suspension bridge capable of carrying traffic was not constructed until 1809, the Chinese are seen to have been at least 1800 years in advance of the West, if not indeed 2200 or more, in this particular field.

## THE FIRST CYBERNETIC MACHINE

1 1 1 1 1

By the third century AD at the latest, the Chinese had a fully operational, navigational cybernetic machine, using the principles of feedback. It was called the south-pointing carriage, but had no connection with a magnetic compass. It was a large carriage, 11 feet long, 11 feet deep, and 9½ feet wide, surmounted by a jade statue of an 'immortal'—a sage who had achieved immortality. The figure's arm was raised pointing ahead, and it always faced towards the south, no matter which way the carriage turned. Even if the road were circular, the jade figure would rotate, keeping the finger pointing in the same direction. How was this possible in the third century AD? This machine may have been invented even earlier, indeed as much as twelve hundred years earlier. An official history for 500 AD describes how

had arrived from a great distance beyond the frontiers. The country was a boundless plain in which people lost their bearings as to east and west, so the Duke caused this vehicle to be made in order that the ambassadors should be able to distinguish north and south.

If this information is correct, the invention would date from about 1030 BC. But Needham suspects that the word 'carriage' was inserted in this account by scribers and that what is being described is a 'south-pointer'—that is, a compass, in which case the origin of the compass, described on page 162, must be pushed back even further.

The next person credited with building a south-pointing carriage is the astronomer and scientist Chang Heng, about 120 AD, although this is also regarded by Needham as doubtful. The only date which he is prepared to accept with certainty is the middle of the third century AD, with the famous engineer Ma Chun as the builder (and, thus, the inventor). The drawing of a pointing figure of jade, taken from the *Universal Encyclopedia* of 1601, was copied from a print of 1341, and is reproduced in Plate 39 (page 72).

If the machine did not use a magnetic compass, how did it work? The answer is that it had a train of differential gears, similar to those in a modern automobile. Perhaps the function of a differential gear should be explained as follows. When a wheeled vehicle is turning a corner the wheels on opposite sides of the vehicle are clearly going to need to turn at different rates since the near side is travelling a shorter distance than the far side. With a hand cart or horse-drawn carriage, this may not pose such problems. But when a vehicle has power being applied to the axle to make the wheels turn, how is it possible for one wheel to be permitted to speed up a little, and the other slow down a little on the same axle? This is made possible only by an ingenious combination of gear wheels and flywheels—the differential gear.

When Needham published his volume on mechanical engineering in 1965, he believed that the Chinese had invented the differential gear, and that it had made its first appearance in this south-pointing carriage. If the first south-pointing carriage were the one attributed to the Duke of Chou about 1000 BC, then the Chinese would indeed have been the inventors, but we must stay on the side of caution, and assume that the first south-pointing carriage was

The south-pointing carriage was first constructed by the Duke of Chou (beginning of the first millennium BC) as a means of conducting homewards certain envoys who

made in the second or third century AD. In that case, we must credit the Greeks with inventing the differential gear a fact which became known only in 1975 when Professor Derek Price published his book *Gears from the Greeks*. In this work Price wrote the definitive account of a Greek differential gear dating from 80 BC, which Price said must surely rank as one of the greatest basic mechanical inventions of all time. And although a transmission of this invention from Greece and Rome to China was possible, it is equally possible that the differential gear was independently re-invented in China for the south-

as much as 90 degrees in a distance only fifty times that between the two wheels.' This was because the carriage would veer more and more to one side if one wheel were smaller (relative slip). So that for this south-pointing carriage, the size of the road wheels had to be accurate to a margin of error far less than one per cent, and a commensurate accuracy in size of the wheels would have been necessary. This points to engineering of such a high order that we may well be stifled in hesitating to apply the word 'ancient' and 'primitive' to it.

The south-pointing device was basically a reversal of the use of the differential gear in the modern

the precision needed in the construction of the south-pointing carriage almost defies belief. For the outside road wheels alone, Needham points out (Quales, in *The First and Second Background of Science*) calculated that a difference of only 1/1000 of the wheel circumference would change the direction of the pointing figure of



右車飾以象牙與骨凡四十二分下長六寸四分轄  
木口圓一寸七分管之木口圓徑三寸四分琺玉爲  
人形手常指南足底通圓爲作旋轉軸端於尾虎之上  
紐於中獲韋於姚枝菴承旨屬主色微黃赤緋古色包  
紉間亦有主花雲飾處按崖豹古今註指南車黃帝作



automobile. Today such gears are used to apply power to turn the wheels and make the vehicle move. But with the south-pointing carriage, which was pulled by animals, the power was transmitted from the wheels, and applied towards the continual adjusting of the position of the pointing figure. Thus it was the differential gear in the machine which turned the figure so that it always pointed to the south. And it did so just as the differential gear operates today, only in reverse.

There also remains evidence of a south-pointing boat, though few details of it survive. It was built during the Chen Dynasty (265-420 AD) and sailed round the palace gardens on the Ling-Chih lake. Needham speculates that it might simply have been navigated by means of a lodestone. But he adds 'An

alternative would be that the boat was a paddle-boat. Paddle-wheel boats certainly existed in China at the time, and that someone attempted to apply to its two wheels the same kind of device as had already been applied to the carriage. Probably no one will ever find out. Whether this boat was or was not a water-borne version of the south-pointing carriage, the principles had already been developed to make it possible.

Needham was called the south-pointing carriage 'the first homeostatic machine in human history involving full negative feedback. Of course the driver had to be included in the loop. But as Coates has acutely pointed out, an attractive carrot held by the pointing figure might have replaced the human driver and closed the loop more automatically. Although Needham has occasionally spoken of the south-pointing carriage as the first actual cybernetic machine, he has qualified this by saying: 'The south-pointing carriage would have been the first cybernetic machine had the actual steering corrected itself as we could easily make it do today.'

## ESSENTIALS OF THE STEAM ENGINE

The essential design of the steam engine, lacking only the crank shaft, was invented in China before the steam engine existed. It was a water-powered flour sifting and shaking machine which operated in reverse mode to the later operation of the steam engine. Instead of the piston of the steam engine working the wheels on a vehicle the Chinese machine had wheels which were worked by rushing water in order to power pistons. The crank shaft could not be incorporated in the Chinese machine because it is a Western invention which the Chinese never had. But it was not necessary.

The machines in question were south of the city of Ching Ming Ssu at the Buddhist monasteries of Loyang. They are mentioned in a book entitled *Description of the Buddhist Temples and Monasteries of Loyang*, dating from about 534 AD. These machines worked on the reciprocating principle of a piston being moved by a connecting rod attached to a crank (powered by a water wheel).

This principle came to be used more widely in connection with the metalurgical industry. A water-powered device of this kind was found to be the most



efficient and labour-saving way to work the giant bellows of blast furnaces. The first published picture of such a machine, appeared in Wang Chen's *Treatise on Agriculture* in 1313. Needham has published a mechanical diagram of how the machine worked (reconstructed from details of the text of Wang Chen's book and other sources), and gives a mechanically accurate description of it.

Here is Wang Chen's own fourteenth-century description:

The design is as follows. A place beside a rushing torrent is selected, and a vertical shaft is set up in a framework with two horizontal wheels so that the lower one is rotated by the force of the water. The upper one is connected by a driving-belt to a smaller wheel in front of it, which bears an eccentric lug. Then all as one, following the turning of the driving-wheel, the connecting-rod attached to the eccentric lug pushes and pulls the rocking roller, and levers to left and right of which assure the transduction of the motion to the piston-rod. Thus this is pushed back and forth, operating the furnace bellows far more quickly than would be possible with man-power.

When Metallurgical Bureaux are established, they often spend a great deal of money and hire much labour to work the bellows, which is very expensive indeed. But by these methods [using water-power] great savings can be made. Now it is a long time since the inventions were first devised, and some of them have been lost, so I travelled to many places to explore and recover the techniques involved. And I have drawn the accompanying diagrams according to what I found, for the enrichment of the country by the official metallurgists and the greater convenience of private smelters.

Wang Chen also mentions the flour sifting and shaking (holing) machine.

A book called *Topography of Anyang District* preserves an account from a now lost work called *Old Manual of Metallurgical Water-Power Technology* which states that these machines were introduced in the sixth century by the eminent engineer, architect and city planner Kao Lung Ch'ih, who was at the time Director of the Ministries Department. He must

have taken the idea of the Loyang flour machines and applied it to metallurgy. The lost work is even quoted as saying that the water wheels which he used were 1 foot broad and 7 feet in diameter. He called the technique 'water power smelting'. This, then, was one of the secrets of Chinese metallurgical supremacy. For we know from another source that by driving the pistons from the smaller wheel on the machine, which spun fifteen times faster than the large driving-wheel, the pistons fanning the smelting fires could work at an enormous rate. The blast would have been continuous since from the fourth century BC the Chinese had used the double-acting piston bellows for this purpose. Consequently, the Chinese had prodigious energies harnessed to provide fully automated continuous air blasts for their metallurgical operations by the sixth century AD. It is no wonder that this was the century which also saw the development of the steel co-fusion process. The excellent steel which the Chinese had been producing for several centuries previously provided the necessary bearings and parts to produce tolerance for such hard-working machinery.

It was seven hundred years before water power in Europe was to be harnessed for bellows, in the thirteenth century. In 1757 John Wilkinson patented a hydraulic blowing-engine which was essentially identical to that described by Wang Chen in 1313 except for the addition of a crank shaft by way of refinement. In 1780, James Pickard patented a steam engine using essentially this apparatus in reverse, that is, power from the piston driving the wheel rather than vice versa. Pickard's patent forced James Watt (who was barred from this standard technique by not having the patent) to invent the sun-and-planet gear for his own steam engine. These European designs were all derived through various intermediaries such as Agostino Ramelli (1588), from those of China. As for pistons driving wheels, rather than the other way round, Chinese stimulus was available separately there. Pistons driven by exploding gunpowder were tried in Europe on the idea, as Needham has put it, that 'the piston and piston-rod may be considered a tethered cannon-ball'. Since the Chinese invented both gunpowder and the gun (see pages 250 and 266) internal combustion as well as steam engines were partly inspired by the fact that a gun has a projectile which exactly fits the barrel and is expelled by force.

further Chinese contributions to the ancestry of both engines

# 'MAGIC MIRRORS'

Those who like to think of China as a land of mystery are well served by the Chinese 'magic mirrors' which are some of the strangest objects in the world. They are known to go back to at least the fifth century AD, though their exact origins are unknown. About twelve hundred years ago, there still existed a book entitled *Record of Ancient Mirrors*, which apparently contained the secrets of these magic mirrors and their construction, but sadly it seems to have been lost for over a thousand years.

When magic mirrors came to the attention of the West in 1832 dozens

of prominent scientists attempted to discover their secret. It was a hundred years before a satisfactory theory of magic mirrors was formulated (by the British crystallographer Sir William Bragg) in 1932. These strange objects had defied the best brains in Europe for a century.

What exactly does a magic mirror? On its back it has cast bronze designs—pictures, or written characters, or both. The reflecting side is convex and is of bright, shiny polished bronze which serves as a mirror in many conditions of lighting. When held in the hand, it appears to be a perfectly normal mirror.

However when the mirror is held in bright sunshine, its reflector reflects



RIGHT & OPPOSITE 40 This is a typical example of a magic mirror. The tiny surface irregularities on the apparently smooth reverse side of the mirror cannot be detected by the eye. However, when the mirror is held in a position of reflection of the sunlight is cast onto a dark wall by the seemingly smooth surface, the picture of cranes, hind legs and the two Chinese characters which have been cast in relief on the ornamented back of the mirror are miraculously visible as a projected image on the wall, as if the solid bronze had suddenly become transparent and the patterns had somehow

passed through the solid mirror and been projected on the wall reflection. The metallurgical process by which this eerie and seemingly supernatural phenomenon is achieved was not scientifically explained in the West until 1932, although the Chinese had been making magic mirrors and keeping the technique secret for 400 years. This particular example in the Victoria and Albert Museum is Chinese, rather than Japanese, and the Chinese written characters on the mirror (which are regularly used by the Japanese) refer to a Japanese play. (Needham Research Institute, Cambridge)

can be 'seen through', making it possible to inspect from a reflection cast onto a dark wall the written characters or patterns on the back. Somehow mysteriously, the solid bronze becomes transparent, leading to the Chinese name for the objects: 'light-penetration mirrors'.

But surely, the reader will protest, solid bronze cannot be transparent. This is true, and there was certainly a trick to it. But it was a sufficiently good trick to baffle Western scientists for a century, and even the earliest surviving Chinese discussion of magic mirrors consists of speculation on how they might work. This occurs in a fascinating work, *Dream Pool Essays*, by Shen Kua published in

1086. Even at this date, Shen Kua thought of the mirrors as coming from some vague archaic period:

'There exist certain 'light-penetration mirrors' which have about twenty characters inscribed on them in an ancient style which cannot be interpreted. If such a mirror is exposed to the sunshine, although the characters are all on the back, they 'pass through' and are reflected on the wall of a house, where they can be read most distinctly.. I have three of these inscribed

'light-penetration mirrors' in my own family, and I have seen others treasured in other families, which are closely similar and very



ancient; all of them 'let the light through' But I do not understand why other mirrors, though extremely thin, do not 'let light through' The ancients must indeed have had some special art... Those who discuss the reason say that at the time the mirror was cast, the thinner part became cold first, while the raised part of the design on the back, being thicker, became cold later, so that the bronze formed minute wrinkles Thus although the characters are on the back, the face has faint lines too faint to be seen with the naked eye.

Although differences of cooling rate are not the explanation, Shen Kua was correct in suggesting that the shiny, polished mirror surfaces concealed minute variations which the eye alone could not detect. Needham says of the experiments carried out by European scientists: 'Careful and extended optical experimentation demonstrated that the surfaces of "magic" mirrors reproduced the designs on the backs because of very slight inequalities of curvature the thicker portions being very slightly flatter than the thinner ones and even sometimes actually concave.'

The basic mirror shape, with the design on the back, was cast flat, and the convexity of the surface produced afterwards by elaborate scraping and scratching. The surface was then polished to become shiny. The stresses set up by these processes caused the thinner parts of the surface to bulge outwards and become more convex than the thicker portions. Finally, a mercury amalgam was laid over the surface, this created further stresses and preferential buckling. The result was that imperfections of the mirror surface matched the patterns on the back, although they were too minute to be seen by the eye. But when the mirror reflected bright sunlight against a wall, with the resultant magnification of the whole image, the effect was to reproduce the patterns as if they were passing through the solid bronze by way of light beams. As Sir William Bragg said when he finally discovered this in 1932: 'Only the magnifying effect of reflection makes them plain.' Needham rightly calls all of this 'the first step on the road to knowledge about the minute structure of metal surfaces.'

What makes magic mirrors so mysterious is that, although they are made of solid bronze, it is nevertheless possible to 'see through' them. Their very existence was thus a great encouragement to those Taoist philosophers and mystics in China who tended to

view normal matter as a grosser form of matter of a mundane sort, and felt that there must be other, far more refined forms of matter which were practically invisible. The Taoists even believed in a kind of immortality which meant that one continued to exist physically in a transparent and tenuous higher state of matter. Such beliefs could have been justified and even demonstrated to the satisfaction of all onlookers by showing them a magic mirror and proving to them that under certain conditions, the most solid matter conceivable — cast bronze — could become transparent.

## THE 'SI-MENS' STEEL PROCESS

1

As described in the previous steel process, cast iron has a high carbon content and wrought iron has practically no carbon content, whereas steel must be something in between if it is to have all the desired characteristics. About the fifth century A.D., the Chinese developed the 'co-fusion' process, in which cast and wrought iron were melted together to yield the 'something in between', which was steel. This is essentially the Martin and Siemens steel process of 1863 though carried out fourteen hundred years earlier.

This process was in full swing by the 8th century, from which time we have a Chinese description of it. Ch'iu-wu Hsiu-Wen also made sabres of "overnight iron." The method was to bake the purest cast iron, prising it up with the soft ingots of wrought iron, until after several days and nights, it was all turned to steel.

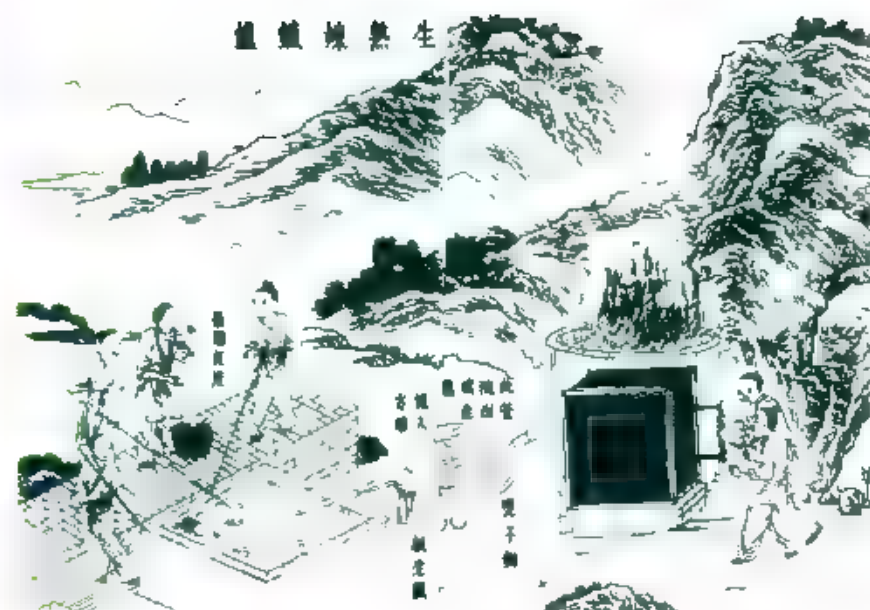
Another account appears in the seventh century. In the *Newly Reorganized Pharmacopoeia* of 659 A.D. we read: 'Steel is made when the raw cast iron and the soft wrought iron are mixed and heated together. It is for making sabres and sickles.'

And in the eleventh century Su Sung informs us that 'By mixing the raw and the soft (cast iron and wrought iron), a metal is obtained for making the edges and points of sabres and swords, this is called steel.'

We are given precise technical details by Sung Ying-Hsing in 1637:

The method of making steel is as follows. The wrought iron is beaten into thin plates or scales as wide as a finger and rather over an





inch and a half long. These are packed within wrought iron sheets and all tightly pressed down by cast iron pieces piled on top. The whole furnace is then covered over with mud (or clay) as well. Large furnace piston bellows are then set to work, and when the fire has risen to a sufficient heat, the cast iron comes to its transformation [i.e. melts] first, and dripping and soaking, penetrates into the wrought iron. When the two are united with each other, they are taken out and forged, afterwards they are again heated and hammered. This is many times repeated.

In our own time, experiments have been carried out at the steel works at Corby in England to reproduce the ancient Chinese steel-making techniques. The experiments were thoroughly successful. A very uniform steel was obtained, with the carbon from the cast iron spread evenly throughout, and a genuine blending of the cast and wrought iron. The original heating went up to  $975^{\circ}\text{C}$ , and the metal was taken out and forged with a hand hammer. It was then heated for eight hours at  $900^{\circ}\text{C}$  and came out beautifully.

It should be mentioned that another key ingredient to the Chinese success story in iron and steel technology was the invention of special bellows for blowing air (see page 46). It enabled a continuous stream to be applied, uninterrupted by the moving backwards of the piston. It would have been impossible

37. Of the eight a small  
operated double-acting piston  
allows in the fire. One of the  
iron bellows is to pump of steel  
dripping out, referring to being

which will be turned into iron

process invented in the 18th  
century. It was especially the  
Ming and Qing dynasties  
process of 1863. It was used

to achieve such success with an unstable, huffing and puffing airstream in such a high temperature steel process. Furthermore, the application of hydrodynamic power to work the piston bellows by means of a horizontal water wheel made larger bellows possible. We must not forget, therefore, that the story of iron and steel in China is at all times surrounded by stories of other, interdependent inventions and techniques.

## THE SEGMENTAL ARCH BRIDGE

A conceptual breakthrough occurred when a Chinese engineer was the first to realize that an arch did not have to be a semi-circle. A bridge could be built with a span based not on the traditional semi-circular arch but on what is known as a segmental arch. The way to envisage this is to imagine a gigantic circle embedded in the ground of which only the tip shows above ground level. This tip is a segment of a circle, and the arch it forms is a segmental arch. Such an arch forms the central arch of the bridge in Plate 42 (page 78). Bridges built in this way take less material and are stronger than ones built as semi-circular arches.

This advance took place in China in the seventh century A.D. It was the concept of a genius, Li Chün, the founder of an entire school of constructional engineering whose influence lasted for many centuries. We are fortunate in that his first great bridge built in



610 survives intact and is still very much in use today. Called the Great Stone Bridge, it spans the Chiao Shui river near Chiao-hsien at the foot of the Shans Mountains on the edge of the North China Plain. It was featured on a postage stamp in 1962 and is one of the achievements of early Chinese engineers of which the modern Chinese have most knowledge, and of which they feel most proud. Many legends have attached themselves to the bridge over the centuries and about the sixteenth century a poet spoke of it as looking like a mountain rising above the clouds, or a long rainbow hanging on a mountain waterfall.

It is difficult for us today to appreciate just how impressive a sight the Great Stone Bridge must have been to pre-modern eyes. For we are used to seeing pre-stressed concrete examples of segmental arch

bridges everywhere spanning all the expressways and motorways of the modern world. But in the seventh century, eyes were not so jaded, and the following inscription was carved on the Great Stone Bridge a little over a century after its construction in 729:

This stone bridge over the Chiao River is the result of the work of the Sui engineer Li Ch'un. Its construction is indeed unusual, and no one knows on what principle he made it. But let us observe his marvellous use of stone-work. Its convexity is so smooth, and the voussoir-stones fit together so perfectly ... How lofty is the flying arch. How large is the opening, yet without piers. ... Precise indeed are the cross-bondings and joints between the stones, masonry blocks delicately interlocking like mill wheels, or like the walls of wells, a hundred forms organized into one. And besides the mortar in the crevices there are slender waisted iron clamps to bind the stones together. The four small arches inserted, on either side, break the anger of the roaring floods, and protect the bridge mightily. Such a master-work could never have been achieved if this man had not applied his genius to the building of a work which would last for centuries to come.

LEFT 42 The Great Stone Bridge spans the Chiao Shui, the world's first segmental arch bridge, built in some of the thirteenth century B.C. in the year 610 and renovated in the year 729. The bridge has a span of 123 feet. Six and one-half was the great segmental arch, the center an inner arch. Some circular arches still exist, a but not the semi-circular arch span arch to either side were also new. They let through a little of flood waters and also allowed a structure to be built in the arches. The arches were a good example for the hundred years.



The four small whole arches, 'breaking the anger of the roaring waters', were incorporated within the structure of the main bridge. They were an innovation of great consequence in bridge-building, for they were the world's first arched spandrels. Li Ch'un found that by punching these holes in the ends of the bridge, he could accomplish several things at once: flood waters could rush through them, lessening the chance that the main bridge would be swept away at its supports in a sudden flood; the total weight of the bridge could be lessened, thereby diminishing the tendency to buckle by the ends sinking down into the river banks; and vast quantities of material could be saved, which would normally have gone to make solid ends for the bridge.

The Great Stone Bridge has a span of 123 feet. The largest surviving Roman whole arch bridge, the

LEFT 43 The so-called Marco Polo Bridge just west of Beijing spans the Yangtze river. It is China's greatest segmental arch bridge, built in 1189 and consisting of a series of segmental arches with a total span of 700 feet.







Pont St Martin near Aosta, spans 117 feet. But the average whole arch Roman bridge spanned between 60 and 80 feet, whereas whole arches in Roman aqueducts had an average span of about 20 feet. The Great Stone Bridge was five hundred years ahead of Europe in one sense and six hundred years ahead in another. For the principle of the segmental arch in bridge construction brought to Europe about Marco Polo's time, first began to be applied in the West at the end of the thirteenth century, as may be seen in the surviving Pont St Esprit across the Rhone and the small Abbots Bridge at Bury St Edmunds in East Anglia. But it was only in the fourteenth century that the principle became widely and daringly applied. Examples are the famous Ponte Vecchio in Florence (1331), the covered bridge at Pavia (1351) and the Castelvecchio Bridge at Verona (1345). However, one has only to look at the last-named to see that arched bridges had not yet been introduced. These came later in the same century to Europe.

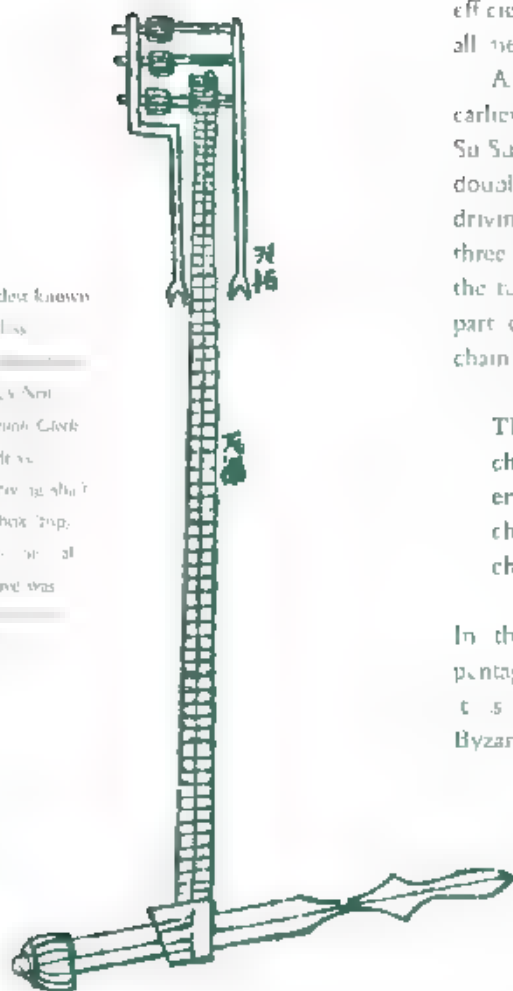
The greatest segmental arch bridge in China is the famous 'Marco Polo Bridge' often so named because Polo described it at length. Just west of Peking (Beijing) it is often visited by tourists. It crosses the Yongting river at the small town of Lu-kou-chiao and is 700 feet in length, consisting of a series of eleven segmental arches extending one after another across the river each with an average span of 62 feet. It was built in 1189 and is still heavily used by modern truck and bus traffic. Marco Polo thought this bridge the finest in the world. He was delighted by the elaborate carved balustrade, consisting of 283 marble lion heads, all different and he enthused about how ten mounted men could ride abreast across it without the slightest inconvenience. This bridge may be seen in Plate 43 (page 78).

## THE CHAIN-DRIVE

The chain drive for transmission of power was invented in China by Chang Ssu-Hsun in 976 AD for use in his great mechanical clock (page 116). Ever since the first century AD, square-pallet chain pumps had existed in China (page 63). Hundreds of thousands of them were to be found all over the Chinese countryside by the tenth century, and the time of Chang Ssu-Hsun. When he came to the problem of transmitting power in his clock, Chang must have

PLATE 45 The oldest known illustration of an endless

published in Su Sung's *New Design for an Astronomical Clock* in 1090. This chain-drive connects the main driving shaft (bottom) to the gearbox (top), which turned an armillary sphere. The chain drive was



been influenced by the common sight of the sprocketed chain of the familiar chain pumps. Though those chains did not transmit power, Chang evidently saw the possibilities of doing so with a similar design. And thus it was that he incorporated this important invention in his clock.

When, in 1090, Chang's more famous successor, the inventor Su Sung, built his enormous astronomical clock tower (see page 117) he tried at first to use a main vertical transmission-shaft. But this did not work. So he also adopted the chain-drive, which he called a 'celestial ladder'. We are fortunate that we actually have a drawing of this chain-drive made by Su Sung himself and published in 1090 in his own book *New Design for an Astronomical Clock*. It may be seen in Plate 45 (above). Obviously, it is the oldest illustration of an endless chain-drive for power-transmission in the world. A shorter and lighter chain-drive was fitted to the clock as a further improvement, when it was discovered that the key to mechanical

efficiency was to eliminate slack wherever possible in all mechanical connections.

Although we have little detail concerning Chang's earlier chain-drive of 976, we have some for that of Su Sung in 1090. The chain can be seen to have been double-linked. The chain-drive coupled the main driving-shaft of the clock apparatus with a series of three small pinions in a little gear-box, which operated the turning of the armillary sphere (an astronomical part of the clock). Su Sung himself described the chain-drive in his book by saying:

The 'celestial ladder' is 19.5 feet long – an iron chain with its links joined together to form an endless circuit, hanging down from an upper chain wheel, and passing round a lower chain wheel on the driving-shaft.

In the ancient Western world, loose chains and pentagonal sprocket-wheels were designed, though it is doubtful if they were built, by Philon of Byzantium about 260 BC. But no transmission of power was envisaged, and the intended use was to provide repeat-loading of a catapult. Even if this machine had been built, it would not have been a proper chain-drive.

The first genuine European chain-drive was made by Jacques de Vaucanson in 1770 for silk reeling and throwing mules. In 1862 J.F. Trety used the chain-drive to make bicycles. Since bicycles are now the leading form of transport in China, it is ironical that only a tiny handful of the Chinese who use them have any idea that the bicycle chain-drive is a native Chinese invention, eight hundred years in advance of a Western equivalent and nine hundred years in advance of its application by a European for the bicycle.

## UNDERWATER SALVAGE OPERATIONS

In the eleventh century AD, at the instigation of a monk named Hui-Ping, the Chinese pioneered a technique of recovering heavy objects from a river or sea bed.

Between 1064 and 1067, the noted pontoon bridge at P'u Ch'u near P'uchow over the great

Yao Yu, who discovered a way to make the  
 water wheel had been arrested and was  
 being taken to the capital. The emperor  
 of the Han Dynasty, who was a very  
 intelligent man, had heard of the water  
 wheel and was very interested in it. He  
 wanted to know more about it, so he  
 asked the emperor's officials to go and  
 find out more about it.

When the emperor's officials came back,  
 they told him that the water wheel  
 was a very useful machine. It could be  
 used to lift water from a well or a  
 river to a higher level. The emperor  
 was very interested in it, so he  
 asked the emperor's officials to go and  
 find out more about it.

The emperor's officials went to the  
 water wheel and saw that it was  
 very simple and easy to use. They  
 found that the water wheel was made  
 of wood and had a large wheel with  
 many spokes. The water wheel was  
 turned by a long pole that was  
 stuck into the ground. The pole was  
 turned by a person who stood next  
 to the water wheel.

The emperor's officials were very  
 impressed by the water wheel and  
 decided to bring it back to the capital.

The emperor's officials brought the  
 water wheel back to the capital and  
 showed it to the emperor. The emperor  
 was very interested in it and asked  
 the emperor's officials to go and  
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 wheel.



# Part 4 DOMESTIC AND INDUSTRIAL TECHNOLOGY

## LACQUER: THE FIRST PLASTIC

Lacquer has been one of the oldest and most useful substances in Chinese history. The use of this lacquer started in prehistoric days, discovered when the lacquer was first mentioned in 1375 in Anyang. Needless to say, the use of lacquer lacquer may be said to have been the most ancient industrial plastic known in the world. It has been in use for well over three thousand years.

Lacquer is obtained rather like rubber, by tapping the sap of oak trees. The lacquer tree (the tree is now commonly planted everywhere by farmers) is indigenous to China but occurs in Europe. It is particularly common in South China, growing at altitudes between 2000 and 7500 feet. The trees are tapped in summer and fall. The sap flows over a period of five to seven years, though in some cases they are cut down after tapping, and an inferior lacquer is obtained from their branches. The largest amount of lacquer is now produced about 50 years.

Lacquer is a plastic which has remarkable powers of preservation, strength and durability. Strong acids and alkalis cause damage. It is resistant to heat, less than 400°-500°F. It is resistant to damage by water and other liquids. It is insoluble in most solvents, and is resistant to bacterial attack. Also, it is an excellent insulator. It is also a good conductor. Its discovery was discovered in 1869. It is one of the toughest and most remarkable vegetable substances in the world, and is the most plastic. The first artificial plastic, the celluloid, was discovered by John Wesley Hyatt in 1869, but the modern plastic industry did not really commence until 1907 with the discovery of bakelite. Today many artificial lacquers are made, and the plastic industry has used lacquer for many applications. The synthetic lacquer is pigmented, and is used in many ways. These lacquers are therefore in every Western kitchen today.

But the lacquer was used for many other purposes of many ages in China. Wood, bamboo or cloth vessels, coated with many layers of this lacquer, formed the splendid dinner service for rich Chinese in place of bone vessels. They were made without the loss of carving and saving of food as well as wood. Chinese emperors gave lacquered articles as gifts, and the lacquer was used for many other purposes. The lacquer was used in China for furniture, pillars and boxes of all sorts. It was used in houses and ships. Weapons, armor, shields and wood, pottery, books and shields were made of it. Lacquer was often mixed with gold and silver, and was used for many other purposes. The lacquer was used for many other purposes. The lacquer was used for many other purposes. The lacquer was used for many other purposes.

The lacquer was used in China for furniture, pillars and boxes of all sorts. It was used in houses and ships. Weapons, armor, shields and wood, pottery, books and shields were made of it. Lacquer was often mixed with gold and silver, and was used for many other purposes. The lacquer was used for many other purposes. The lacquer was used for many other purposes. The lacquer was used for many other purposes.

The lacquer was used in many different grades, the best apparently being the white. When lacquering an article, it is used in successive coats of inferior lacquer, and then the best grade for the last coat. Each time the coat was applied and allowed to dry completely before the application of the next coat. In the best quality lacquer, several work, some hundred coats of lacquer were applied, and the lacquer was used for many other purposes.





depth for carving. Various pigments can be added to give colour, the traditional basic colours being black, red, brown, yellow, gold and green. A particularly intriguing colour was the 'pear-ground' lacquer made with gold dust and gamboge gum resin.

The lacquer industry in ancient China was highly organized, in the traditional Chinese bureaucratic way. There were both private and state lacquer manufacturing centres. There is a lacquered wood wine cup in the Musée Guimet, Paris, which can be dated precisely to the year 4 AD by an extraordinary inscription which besides giving the date of manufacture lists seven artisans involved in making the cup and five other officials of the company. This offers a fair idea of the Chinese approach to manufacturing as long as two thousand years ago. Twelve people to produce a single cup, nearly half of them functionaries who perhaps never even saw it! But on the other hand it indicates also the use of something very like the modern industrial production-line.

As early as the second century BC, the Chinese had made important chemical discoveries about

lacquer. They found a way to keep it from going hard by evaporation. What they did sounds like an old wives' tale: they threw crabs into lacquer to keep it liquid! The *Book of Master Han Nan*, of 120 BC, however, says that crabs spoil lacquer so that it will not dry and cannot be used. Many subsequent authors mentioned this apparently ridiculous tradition. Li Shih in the twelfth century wrote that 'after coming in contact with crabs, lacquer will not congeal'.

Crustacean tissue does in fact contain powerful chemicals which inhibit certain enzymes, including the one which makes lacquer solidify! Needham comments on this bizarre business as follows:

What part, then, were the crab tissues playing? There can be no doubt that the ancient Chinese, before the 2nd century BC, had accidentally discovered a powerful laccase inhibitor. By preventing the action of the enzyme the darkening and polymerization were also prevented. So great an interference with the course of nature, analogous to the arrest of a spontaneously occurring rigidification



BELOW (48) As in other places, lacquer survives for a long time without disintegrating. This lacquered roller box dates from the Han Dynasty (207 BC - 220 AD) - approximately two thousand years old. The box is made of simple fabric, but its many layers of lacquer coating have ensured its preservation. (British Museum)





It was also found that the alcohol content could be raised by continually adding more and more cooked grain in water to the brew as the fermentation proceeded. They called this 'killing' the grain. The 'topping-up' process eventually reached a peak above which it would not go, but it led to a 'strong drink' indeed. Apart from its spread to Japan centuries ago, 'strong beer' has never been adopted by other cultures and indeed there remains no direct translation of its name into any Western language. This is one Chinese invention which has yet to be appreciated by the world at large.

## PETROLEUM AND NATURAL GAS AS FUEL

Petroleum and natural gas were used as fuel in China many centuries before the West and it is probably a conservative estimate to say that the Chinese were burning natural gas for fuel and light by the fourth century BC. We know that this occurred before the Han Chinese overmastered the local tribes in the southern province of Szechuan, starting in the third century BC. The deep boreholes drilled for brine also yielded natural gas from time to time. These methane gas deposits tended to occur under the brine, but many boreholes, including those intended for brine, yielded only natural gas and were known to the

Chinese as 'fire wells'. These boreholes were being drilled systematically for brine by at least the second century BC so that deep supplies of natural gas were tapped from that date by boreholes going down at least several hundred feet. And the systematic search for natural gas itself by deep drilling is recorded in the *Shih Chi*.

Chang K'iu in 347 recorded in his book *Record of the Country South of Mount Hua*:

At the place where the river from Pu-p'u joins the Huo-chang River, there are fire wells, at night the glow is reflected all over the sky. The inhabitants wanted to have fire, and used to ignite the gas outlets with brands from household hearths, after a short time there would be a noise like the rumbling of thunder and the flames would shoot out so brilliantly as to light up the country for several dozen li around (several miles at least). Moreover they use bamboo tubes to 'contain the light', conserving it so that it can be made to travel from one place to another, as much as a day's journey away from the well without its being extinguished. When it has burnt no ash is left, and it blazes brilliantly.

The bamboo tubes here probably refer to pipe in, though we shall see that portable containers for the gas were later used. Bamboo pipelines did indeed

THE FIRE WELLS  
seen on Chen Shan in the  
province of Szechuan. On the  
mountain side, with several  
hundreds of the wells,  
the gas is collected in  
bamboo tubes and  
burns, where it would  
be burnt or used as fuel.





RIGHT 52 A poorly developed photograph taken about 1900 by Ernst Doerschmann showing the whirling derricks of the Szechuan natural gas fields

carry both brine and natural gas for many miles, sometimes passing under roads and sometimes going overhead on trestles. If the brine needed lifting again to greater heights in order to flow downwards by gravity, pumps were employed. But this was not necessary for natural gas, which rose naturally.

The ignition and use of the natural gas for light and fuel posed problems which were successfully overcome by the ancient Chinese. The natural gas which comes from shallow boreholes is not very strong and if piped directly to burners can be lit safely. But the kind of pungent, powerful natural gas which the Chinese obtained from the majority of their boreholes, from depths below 2000 feet, had to be mixed with air before it could be safely burnt. There must have been many catastrophic explosions before the principles involved were learned.

Old texts describe in some detail the complicated arrangements which were eventually adopted to control the burning of natural gas. The gas from the fire wells was fed first into a large wooden chamber about 10 feet below ground level over the mouth of the borehole. It was basically a cone-shaped barrel into which an underground pipe also conveyed air. The chamber therefore acted as a great carburettor, feeding into banks of pipes which led to other smaller conical chambers which rested on the surface of the earth. These too took in air with a variety of entry pipes which could be opened or closed, so that a fine-tuning of the 'engine' was possible by a continuous manipulation of the fuel/air mixture. If the pressure of the mixture were to flag, dangerous flash-backs and explosions could occur, so the main chamber would be opened up further. But fires could result if the mixture were too rich, so surplus gas was allowed to escape through what was called a 'sky thrusting pipe' exhaust system.

Although uncontrolled emissions of natural gas, when ignited, could either flame up 100 feet in the air or even explode the wells with carburettors had



their gas piped along tubes to the various outlets where flames 1 1/2 feet high were commonly produced. These would be used to heat evaporation pans of brine. The cast iron pans were gigantic and weighed as much as 1000 pounds, though there were outlying pans which were smaller. The brine was gently warmed in the smaller pans and then transferred to the great pans for fierce boiling. Natural gas from very shallow wells could easily heat between ten and forty pans. But from the more common deep wells of about 3000 feet depth, the gas commonly serviced 600 to 700 burners, and one case at Fu-ch'ang is recorded where as many as 500 evaporation pans were heated by a single fire well, though this figure must include small as well as large pans.

Flames smaller than 1 1/2 feet high were used for other purposes, such as providing lights in certain Szechuan towns. These early gas lamps antedated Victor an England by many centuries. The gas was also available for heating in these towns, though details of how it was employed are lacking. It seems doubtful that proper gas stoves existed, and it is more likely that the heating applications were generally for cooking and boiling uses. More research is necessary in the old gazetteers of Szechuan in order to try to find further information about the uses to which natural gas and petroleum were put there over the millennia. The thousands of regional Chinese gazetteers, which go back many centuries, have never been properly studied, and priceless information

relating to Chinese science and technology has been found in those few which have been examined.

It is one such gazetteer, dating from before the tenth century and surviving only in quotations in a later work, which tells us how the Szechuanese anticipated modern portable butane gas cylinders for carrying supplies of natural gas.

Lun-ch'ung has a fire well which is over 600 feet deep and which burns brightly at the opening. People use tubes to carry it around, and they can go over a hundred li (dozens of miles) and still be able to light it.

Thus, a man could travel for a couple of days and then open up his gas cylinder, probably through a tap, and cook himself a meal. Other portable heat sources included petroleum products, which often went under the name of 'stone lacquer' because they looked like lacquer but seeped from the stones. A book of 980 records

Some fire wells produce a liquid too. The people of the commandery use bamboo tubes to carry it to light their way in the same manner as ordinary people carry torches. This is because the liquid is inflammable.

Another book by Yang Shen in the sixteenth century recorded of the 'fire wells' at K'ang-tung and Chien-wei.



The streams produce oil which when heated bursts into flame. People take it and use it in lamps like candles. This oil is just an accumulation of solar essence. It is nothing strange.

The domestic uses of petroleum products seem to have been confined to modest applications such as oil lamps and oil-fired torches, but they were used on a large scale for breaking up rocks by fire. Since burning oil could burn in water boulders in harbours were sometimes broken apart by having burning oil poured over them.

The bamboo tube 'butane cylinders' have apparently been seen in use in the hinterland of China by modern scholars, though no photograph appears to exist of one in operation. Leather bags were also employed. A seventeenth- or eighteenth-century account survives in one of the Szechuan gazetteers entitled *Historical Geography of Fu-shun in Szechuan*.

There is a fire well 90 li west of the prefectural seat of Fu-shun which is 40 to 50 feet deep and has an opening 5 or 6 inches in diameter. Gas rises up from it. Bamboo tubes with their partitions removed lead it off from the well and when fire is applied the gas ignites. The flames may be small or they may leap up several feet into the air making a noise like thunder as they burn, the gas is led through underground conduits to heat the brine, never ceasing day and night. When not wanted for use, it is doused with water and extinguished. Furthermore, bamboo tubes which have been bored through are joined together to lead the gas away. It can be used as a

LEFT (53): A photograph taken by Cecil Stiles in the Second World War showing a workman at the T'ieh-shue Salt Wells in Szechuan Province. He is sorting brine in a vat which is being heated by the jet of a natural gas flame in the manner practised since the fourth century BC in China. Natural gas is found in brine deposits in sufficiently deep wells. Using their traditional drilling techniques, the Chinese could reach depths of 1,000 feet.

substitute for firewood and torches. Travellers going to a distance carry the gas with them in leather bags. After travelling even as far as several thousand li, a hole is punctured, touched with fire, and light and heat come instantaneously.

But because these phenomena were rather regional in nature the Chinese of other regions did not necessarily have much familiarity with them. About 1600 Sung Ying-Hsiang wrote:

The 'fire wells' of Western Szechuan are a highly amazing phenomenon, there is cold water in them but not the slightest evidence of the essence of fire. Yet men take long bamboo stems and split them, then put them together again so as to form a pipe, wrapping it securely with varnished cloth, thus tube they insert into the well... it will be seen that hot dry flames are bursting forth from the pipe. Yet if the bamboos are opened and examined, no sign of charring or burning can be seen. To use the spirit of fire without seeing the form of fire – this is indeed one of the strangest things in the world.

## PAPER

— CHUNG-CHANG CHU

Although the word 'paper' is derived from the word 'papyrus', paper and papyrus have nothing whatever to do with one another. Papyrus, which existed in Egypt as early as the third millennium BC, is made from the inner bark of the papyrus plant (*Cyperus papyrus*). Apart from the fact that it gives a sheet on which one can write, it is completely and totally different from paper. The Chinese invented paper, by the second century BC at the latest.

Paper in the modern world is mostly made of wood pulp. But, just to confuse the issue even more, paper in ancient times was never made of wood pulp. So what then is paper?

Paper is the sheet of sediment which results from the setting of a layer of disintegrated fibres from a watery solution onto a flat mould, the water being drained away, and the deposited layer removed and dried. The fibres can be of any material whatever, though plant fibres are by far the most commonly used ones, and as remarked above, fibres from trees are

the mainstay of the paper industries today. The earliest European paper was not made of wood pulp, but of disintegrated and pounded rags of linen. Anyone who owns or has handled a book printed in the seventeenth century in Europe will be aware of how durable and springy the paper is, this paper is made of linen, and it will still be youthful and fresh when most of the books printed in the twentieth century have disintegrated to dust.

The oldest surviving piece of paper in the world was discovered by archaeologists in 1957 in a tomb near Sam-m Shensi Province, China. It is about 10 cm square and can be dated precisely between the years 140 and 87 BC. This paper and similar bits of paper surviving from the next century are thick, coarse and uneven in their texture. They are all made of pounded and disintegrated hemp fibres. From the drying marks on them it is evident that they were dried primitively on mats woven as pieces of fabric, not on what we know as paper moulds. In these early days, the water just drained slowly through the underlying mat of fabric, leaving the paper layer on top. This was then peeled off and dried thoroughly. But so thick and coarse was the result that it could not have been very satisfactory for writing.

However, paper does not appear to have been used as a medium for writing until a considerable time after its invention. The oldest surviving piece of paper in the world with writing on it was discovered under the ruins of an ancient watchtower in Tsakhorter near Chu-yen in 1942. The watchtower was abandoned by Chinese troops during the rebellion of the Hsiao-chiang tribe, and the paper can thus be dated to 110 AD. It contains about two dozen readable characters.

It is probable that paper was in use for a century or more in China before its possibilities as a medium for writing were noticed. Its earliest uses were in connection with clothing, wrapping, lacquerware and personal hygiene. A text of 93 BC records an imperial guard recommending to a prince that he cover his nose with a piece of paper – the first Kleenex! A record of a murder case from 12 BC notes that the poison used had been wrapped in red paper. By the time of the Emperor Kuang-Wu (reigned 25-26 AD) an official of the imperial secretariat was already responsible for the seals and cords of office, and for paper, brush and ink.

The use of paper for clothing may at first seem strange, we think of paper as being thin today, and hardly the proper material to keep out the cold. But



the use of paper as protective clothing against the cold was practised by the Chinese from the second century BC onwards. We are not certain when the Chinese in the south began making paper of the bark of the paper-mulberry tree (*Broussonetia papyrifera*), but the pounded bark of this remarkable tree was found to be serviceable for clothing from an early date. And it would seem that not long after paper proper was invented, the disintegrated fibres of paper-mulberry bark were employed, as well as the more common hemp, to make real paper.

However, the earliest uses of paper were derived from the simple pounded bark of this tree. We know that in the sixth century BC, a disciple of Confucius named Yuan Hsien from the State of Lu wore a hat made from paper-mulberry bark. The historian Ssuma Ch'ien records that in the second century BC huge quantities of this substance were in commercial circulation. A paper hat, a paper belt, and a paper shoe dating from 418 AD were discovered in an excavation at Turfan, and reported in 1981.

But surely articles of clothing made from paper were too flimsy? Perhaps the inferior paper of today, made from wood pulp, would be. But the paper of those days, made from much stronger and tougher fibres, was not. So tough was paper then that it was

frequently used as a shoe liner. And paper clothing was so very warm and impenetrable by cold winds that people complained that it allowed no circulation of air round the body and was too hot to wear. Beds in winter were kept warm with paper curtains, and thin curtains, also of paper, were used as mosquito nets.

The poet Lu Yu wrote a letter to the philosopher Chu Hsi, about the year 1200, thanking him for the gift of a paper blanket. The letter survives, and we are able to enjoy the amusement of reading Lu Yu's rapturous account: 'I passed the day of snow by covering me with a paper blanket. It is whiter than fox fur and softer than cotton.'

Not only was paper used for clothing, it was used for military armour. In the ninth century a provincial governor named Hsu Shang is recorded as keeping an army of a thousand soldiers ready at all times clothed in pleated paper armour which could not be pierced by strong arrows. Paper armour became common on land and at sea. When two pirate ships surrendered in an amnesty in the twelfth century, 110 suits of paper armour were handed over by them. And in the twelfth century, 'Chen Te-Hsu is recorded as saying that he had sufficient weapons at his fort for defence, but of his hundred sets of iron armour, he had kept half of

BELOW 54 A late-eighteenth-century painting showing the manufacture of paper. The large vat contains a watery solution of disintegrated fibres. A mould (one mesh screen similar to the one resting on the side at left) is being lifted from the vat and drained. The remaining wet sediment will be dried and peeled away as a sheet of paper. The piles of paper sheets resulting from this process are at the right, resting on planks over the vat. (Victoria and Albert Museum, London)





ABOVE 55: A modern demonstration of the traditional Chinese method of paper making at the Ontario Science Centre. Here the mesh screen (made of bamboo) is lifted from the vat with a variety of disintegrated fibres. Although most paper in the modern world is made from wood pulp, the Chinese never used it, preferring the stronger fibres of linen and a variety of other plant materials, most

them and traded in the other fifty for sets of the better paper armour. Even bullets from guns were said to be unable to pierce good paper armour, as we read in this account in 1629 by Mao Yuan-I:

Armour is the basic equipment of soldiers, with which they are able to endure without suffering defeat before sharp weapons. The terrain in the south is dangerous and low, and where foot soldiers are generally employed they cannot take heavy loads on their backs when travelling swiftly. If the ground is wet or there is rain, iron armour easily rusts and becomes useless. Japanese pirates and local bandits frequently employ guns and firearms, and even though armour made of rattan or of horn may be used, the bullets can nevertheless pierce it. Moreover, it is heavy and cannot be worn for too long. The best choice for foot soldiers is paper armour, mixed with a variety of silk and cloth. If both paper and cloth are thin, even arrows can pierce them, not to say bullets, the armour should, therefore, be lined with cotton, one inch thick, fully pleated, at knee length. It would be inconvenient to use



ABOVE 56: A later stage of the traditional demonstration at the Ontario Science Centre. Here the layer of sediment accumulated on the mesh screen from the vat is dried and is being delicately peeled off a sheet of paper. Paper (which is completely different from papyrus) was invented in China by the second century BC, but did not reach Europe until a thousand years later. Its secret remained hidden and was not made in Europe until the twelfth century.

in muddy fields if too long and cannot cover the body if too short. Heavy armour can only be used on ships, since there soldiers do not walk on muddy fields. But since the enemy can reach the object with bullets, it could not be defended without the use of heavy armour.

The Chinese also invented wall paper, apparently as a result of hanging up large printed paper sheets which it was found more convenient to glue to the walls. Wallpaper was brought to Europe from China in the fifteenth century by French missionaries.

As for the sanitary uses of paper, there are some surprising statistics for this from China. In 1393 the Bureau of Imperial Supplies manufactured 720,000 sheets of toilet paper measuring 2 feet by 3 feet each for the use of the imperial court for one year. In addition, 15,000 special sheets, 3 inches square, 'thick but soft, and perfumed' were prepared for the exclusive use of the imperial family for the same year. Toilet paper was generally made from rice straw fibres, which were cheap and easy to process. Untold millions of sheets of toilet paper were in use in the Middle Ages. In and around the year 900 in the province of Chekiang alone, the annual production

of toilet paper amounted to ten million packages of between 1000 and 1500 sheets each. This means that Ch'iang was producing between ten and one hundred billion sheets per year at a time when barely any at all was presumably being used in the West. If we multiply the Ch'iang statistics to take in the whole of China it means that many thousands of billions of sheets of toilet paper were being used there a century ago. How far back did the use of toilet paper go in China? We can trace it in texts from as far back as the sixth century, when the scholar official Yen Chih-Tu wrote in 582: "Paper on which there are quotations or commentaries from the *Four Classics* or the names of sages, I dare not use for toilet purposes. And in Arab of 851 wrote: "They [the Chinese] are not careful about cleanliness and they do not wash themselves with water when they have done their necessities but they only wipe themselves with paper."



ABOVE 57) A wheelbarrow for carrying particularly heavy loads as used in southern China in the seventeenth century, and still in use today by farmers and workers. This engraving was published in 1637 in the book *The Faience of Siam and Malacca* (L'art de la faïence de Siam).

The other uses of paper in China were so many that it would take too long to enumerate them in this volume. Obviously paper was important for the making of kites, another Chinese invention (page 188) and the Chinese were also the world's leading paper-folders, as well as paper-cutters for decorative designs. Some ancient paper flowers survive to this day, and the art of *origami* (fancy paper-folding), which originated in China, is now popular around the world. Paper umbrellas and paper money both originated in China and are discussed elsewhere (pages 108 and 131). The large number of substances whose fibres were used for Chinese paper-making make a study in themselves, and include bamboo, straw of rice and wheat, sandalwood, hibiscus, seaweed, floss silk from silk cocoons, rattan, jute, flax, and ramie. Chronologically hemp was the main material in earliest times, followed by paper-mulberry fibres, then rattan, then bamboo, and later straw. All sorts of fancy, perfumed, glossy and other special papers were prepared in China, some of which probably exceed any which have ever been produced in the West.

Paper reached India in the seventh century and West Asia in the eighth century. For five centuries the Arabs jealously guarded the secret of paper-making and would not reveal it to the Europeans, but sold them paper instead at great profit. The Arabs had learned the techniques of paper manufacture from some Chinese prisoners of war captured after a battle at Samarkand. Europe obtained its first paper through the Arabs at around the end of the eighth century. However, the next signs of paper being used in Europe date no earlier than the eleventh century, and paper seems to have been slow to replace papyrus in the West. The first manufacture of paper in Europe dates from the twelfth century, and it was not until the thirteenth century that an Italian paper industry could be said to be in full swing. This is fifteen hundred years after its invention in China.

## THE WHEELBARROW

It may seem difficult to believe, but wheelbarrows did not exist in Europe before the eleventh or twelfth century. The earliest known Western illustration of a wheelbarrow is in a window at Chartres Cathedral, dated about 1220. Considering that the use of wheelbarrows could cut the number of labourers





The earliest descriptions of the construction of wheelbarrows are couched in coy and obscure language. For the first few centuries, wheelbarrows were of great military importance, and specifics of their construction were closely guarded secrets. Various sorts were produced which could carry hundred of pounds each. Some carried men on seats and others carried supplies. Huge numbers of them were used to supply armies fighting in difficult, hilly terrain, in which China abounds. Many battles could never have been fought and won without wheelbarrow supply brigades. Another use of wheelbarrows was to form protective movable barriers against cavalry charges, which could be arranged in any shape at a moment's notice. The ingenuity of the Chinese at exploiting the wheelbarrow was limitless, and they were even

given sails, with which they could achieve speeds over land or ice of 40 miles per hour (see account on page 216).

Scenes from medieval China showing wheelbarrows abound. We are fortunate that a great painting by Chang Tsun-Tian of the city Kaifeng (then the capital in the year 1125) survives, in which various types of wheelbarrow may be seen. An empty one stands before a draper's shop, while a loaded one passes a dyeing establishment. Another is seen being loaded with sack-like objects outside the best hotel, while beside it in the street passes one so heavily laden that a mule pulls it, with one man pushing and another man pulling. Wheelbarrows were thus ubiquitous features of Chinese life – and still by this time they had not yet reached Europe.

A large variety of designs existed, some with wheels in the dead centre, with the weight resting entirely on the axle and others with wheels forward as they are today in the West. Some had tiny wheels, some had huge ones. Additional small wheels were sometimes fitted in front to ease the passage over potholes and other obstacles. Practically any shape and size of wheelbarrow existed – and still exists – in China. Many of these designs have still not passed beyond the confines of China and made their way West, despite the fact that, for particular uses, many of them are far superior to the kind Westerners generally use. One can honestly say that the wheelbarrow in all its forms is still an invention which the West has yet to discover.

OPPOSITE (58): Loaded wine being transported by a traditional Chinese wheelbarrow near Shanghai in 1938. The Chinese invented the wheelbarrow as the first centre-balancing cart, but it did not reach Europe until the twelfth or thirteenth century AD, and many of the best wheelbarrow designs have never been adopted in the West. This type, with the large central wheel, can be pulled from the front as well as pushed from behind and it carries much more.



## SLIDING CALLIPERS

A measuring tool very much like the modern adjustable wrench (spanner) was used in ancient China at the time of Christ. Plate 59 (page 98) shows a diagram of one.

The tool which is made of bronze is an adjustable sliding calliper gauge with slot and pin. The only difference between it and a modern adjustable wrench is that it does not have the small revolving worm (screw). The side which was used for measurement is decimally graduated in 6 inches and in tenths of an inch. On the other side there is an ancient inscription which, translated, reads 'Made on a *kuai-yu* day at new moon of the first month of the first year of the Shih-Chien-Kuo reign-period.



ABC 74 (5) These sliding calipers are an adjustable spanner without the worm. Unknown in Europe before Leonardo da Vinci sketched a set they first came to be used in France in 1613, but the Chinese invented them in the first century BC. This illustration published in China in 1425 depicts a surviving example of the measuring tool in bronze, with slot and pin for the sliding adjustment outside the caliper gauge, which dates from 9 AD, and bears an inscription on the right side which says it was 'Made on a kua-yu day a new moon of the first month of the first year of the Shih-Chieh Kuo reign period. The left side of the tool is graduated in 6 inches and tenths of an inch.

This dates the implement to the first year of the reign of the Emperor Wang Mang, or 9 AD. This is the most impressive measuring instrument surviving from any ancient culture. These sliding calipers graduated in inches and tenths of inches must have been developed by the preceding century, the first century BC.

In Europe, sliding-scale calipers were introduced by Pierre Vernier in 1631 and the screw micrometer by William Gascoigne in 1638 for use

in CH 74 (6) The magic lantern, also known as the peep-hole lantern, had been invented by the second century AD in China. This traditional example shows horses, which move round a central light. Magic lanterns seem to have reached Europe in the seventeenth century.

in astronomy. The date of the earliest European camper gauge is not known for certain before this though the first such idea seems to have occurred in sketches made by Leonardo da Vinci over a century earlier. For the fu-siding-scale caliper, however, the Chinese were in advance of Europe by approximately 700 years.

## THE MAGIC LANTERN

The magic lantern, or zoetrope, is a device which held audiences spellbound before the modern era, and has always had a particular fascination for children. It can exist in various forms, but essentially it consists of a series of pictures through which light shines, and which move in succession to give the illusion that the figures in the pictures are themselves moving. It is thus the earliest ancestor of the cinema. The pictures can be turned by hand or automatically (as by vanes turned by hot air currents rising from a lantern). The pictures are generally seen projected on a wall or a screen, though street shows in portable boxes have instead a peep-hole through which one peers at the moving pictures inside the box. When projected it is better that lenses be used, though they are not essential.

In 1868, W. B. Carpenter, the Vice-President of the Royal Society, wrote that the zoetrope, or magic lantern, had been invented by Michael Faraday in 1836, only thirty-two years earlier. This was wrong since John Bate had described the same thing in his book *Mysteries of Nature and Art* in 1634. But the real truth is that the zoetrope was invented in China.

The projection of moving images on a screen is recorded as having been practised in 121 BC when a magician named Shao Ong staged a kind of seance for an emperor in this way. But another early form of magic lantern was in the possession of an emperor who died in 207 BC after the lamp was lit, one could see the sparkling of scales of turning dragons. The same emperor had a similar object called 'the pipe which makes fantasies appear'. It seems to have had a small windmill or air turbine connected to it, for we are told in the book *Miscellaneous Reports of*



the *Western Capital* written in the sixth century A.D. There was a jade tube two feet three inches long, with twenty-six holes in it. If air was blown through it, one saw chariots, horses, mountains, and forests appear in front of a screen, one after another, with a rumbling noise. When the blast stopped all disappeared.

The next record we find of a magic lantern occurs in about 180 A.D. At that time the inventor Ting Huan had perfected a 'nine-storied bud censer', which seems to have been a vastly complicated multiple magic lantern. Attached to it were strange birds and mysterious animals which moved around when a lamp was lit. A similar device is described by Tao Ku in his book *Records of the Unworldly and Strange*, published about 950 A.D. 'Moving shapes were seen and tinkling noises heard, after the lighting of a candle or lamp.

By the twelfth century, magic lanterns were called horse-riding or horse-pacing lamps, since after the lamp was lit, a succession of prancing horses was projected round about on the walls, moving as if on their own. Europeans discovered these toys when they began visiting China, and a Jesuit missionary named Father Gabriel de Magalhães has left this description of one from the middle of the seventeenth century:

The Lamps and Candles, of which there are an infinite number in every Lanthorn [lantern], are intermix'd and plac'd withinside, so artificially and agreeably, that the Light adds beauty to the Painting, and the smoak gives life and spirit to the Figures in the Lanthorn, which Art has so contriv'd, that they seem to

LIGHT 66 A nineteenth-century painting of an itinerant peep-show—a box containing a magic lantern. Up to four people can peep through the holes at once and the effect is of a moving picture show. The magic lantern is the direct ancestor of the cinema, with its illusions of animated pictures. Note also another device: the umbrella. Via the a and Albert Museum, London.







A predecessor of the fishing reel is mentioned in the *Mo Tzu (Book of Master Mo)* which dates from about 320 BC. This book was the canon of a group of warrior-philosophers and proto-scientists, the Mohists, who made many innovations in military technology. One of their machines for war was an *archiballista*—an early form of artillery which fired groups of javelins at the enemy. Javelins were too valuable to waste so they were attached to cords and could be retrieved for re-use by means of a reel and windlass, though probably if a javelin was sticking through somebody's chest, it was left there. It is certainly ironical that this military device led to the development of that most peaceable of inventions, the fishing reel.

## THE STIRRUP

For most of the time that man has been riding horses, he has had no supports for his feet. Stirrups were unknown to most of the great armies of ancient times—the Persians and Medes, the Romans, the Assyrians, the Egyptians, the Babylonians, the Greeks. The horsemen of Alexander the Great made their way across the whole of Central Asia without being able to rest their feet while in the saddle. When galloping or jumping, horsemen had to hold the horse's mane tightly to avoid falling off. The Romans devised a kind of hand-hold on the front of the saddle which gave them something of a grip when the going got rough, but their legs just dangled whenever they were not pressed tightly against the horse.

Mounting a horse without stirrups was not so easy either. Fierce warriors took pride in their flying leap—gripping the mane with the left hand and swinging themselves up, and some bareback riders still do this today. Cavalry-men of ancient times used their spears to help them up, either by hoisting themselves aloft by the shaft, or by using the spear sticking out of the saddle as a foot-rest. Otherwise it was necessary to rely on a groom for a leg-up.

By about the third century AD, the Chinese had remedied this situation. With their advanced metallurgical expertise they began to produce cast bronze or iron



Stirrups

No invention of the stirrup is recorded and

the original idea probably

came from the occasional use of a loop of rope or leather to assist in mounting. Of course, such loops could not be used for riding, because if one fell off one would be dragged along and come to a sorry end. Such loops may have been first used by the Chinese, the Indians, or the nomads of Central Asia bordering on China. The essentials of the stirrup may thus have originated in the steppes, the product of ingenious men whose lives were lived on horseback. Apparently from the third century, the Chinese were casting perfect metal stirrups. The earliest surviving depiction of a stirrup is on a pottery







the first time

porcelain first

the first time

into a glass when fired at a temperature for porcelain production. The result is porcelain, which can often be seen through. Since the clay is opaque while the glass is transparent, the resulting fusion of the two gives a substance which is partially transparent, or translucent.

Just how astounding this was when first seen by foreigners may be judged from the remarks made by the Arabic merchant Suleiman, who wrote in 851 AD in his *Tarikh al-Hind* of porcelain which he had seen in China. "There is in China a very fine clay from which are made vases having the transparency of glass bottles, water in these vases is visible through them, and yet they are made of clay."

It was incomprehensible to foreigners that pottery could be translucent and let the light through since clay was well known to be opaque. This seemed to be a miracle: how could one see through something which everyone knows cannot be seen through? Pots and vases through which the light could pass? Incredible! Absurd!

Porcelain was not a sudden invention which took place at a particular time. It was arrived at gradually in China. Textual evidence is hopelessly confused and vague, owing to problems of terminology, so that archaeological discoveries are the only means of determining when porcelain first came into being. Fresh discoveries keep pushing back the dates further into the past. 'Proto-porcelain' or 'primitive porcelain' made of kaolin clay, of

compact texture, and surprisingly lustrous, apparently goes back to the eleventh century BC. But these wares do not have the fusion of the clay with feldspar and quartz, so that they are not true porcelain.

Historians of porcelain and ceramics are not always in agreement about when the line was crossed from proto-porcelain to proper porcelain. However, it now seems that archaeological finds push back the date of true porcelain to the first century AD. By the third century AD, in any case, true porcelain was undeniably in use.

By the Sung Dynasty (960-1279), porcelain had reached heights of artistry which some believe were never surpassed and have not been equaled since. Porcelain manufacture by this time was a highly organized trade employing hundreds of thousands of people. There were teams of men who specialized in washing the clay, others who concerned themselves only with glazes, others who maintained the kilns and so on. One kiln of this period which has been excavated could accommodate twenty-five thousand pieces of porcelain at a single firing. It was built on the slope of a hill, the gentle incline of about 15° reducing the speed of the flames through the kiln. The sophistication of the kilns was most impressive. Some were fired by burning of wood, while others were down-draught burners of charcoal. Flues were naturally employed, along with sophisticated layers of insulation, buttresses and clay linings. Control of the firing process

was of the utmost precision. Porcelain could be fired either in oxidizing or de-oxidizing (reducing) flames. In the Ming Dynasty, when the famous blue-and-white ware was largely produced, the best lustrous quality of the cobalt blue pigment could only be obtained at certain specific temperatures, and in a reducing flame. Various metals used as pigments spread themselves chemically throughout the bodies of the porcelain objects in quite different ways depending on whether oxygen is being taken in or given off. A reducing flame forces porcelain to give off oxygen, leading to some of the most beautiful effects. The achieving of certain colours and effects in porcelain is therefore the result of intricate and subtle control of firing conditions of the kilns.

The secrets of porcelain manufacture were jealously guarded, and visitors from Europe such as Marco Polo could but gape and wonder. Porcelain objects were still a very great rarity in Europe by the fifteenth century. They were gifts for kings and potentates. Not until 1520 did the first sample of kaolin clay reach Europe, brought by the Portuguese. Europeans then thought that if only they could find deposits of this white clay, they would be able to make porcelain. Frantic efforts were made to locate deposits, in ignorance of the fact that kaolin clay alone was far from sufficient for the making of porcelain.

The countless experiments carried on with various earths and solid substances in furnaces eventually had a most unpredictable result. Scientists and craftsmen began

to notice that upon cooling down again, molten minerals could crystallize. Until this began to be observed, Western scientists had been convinced that crystals could only be formed from liquids. About the middle of the eighteenth century in Europe, the idea began to gain ground that perhaps the Earth's rocks could have been formed from the cooling of molten masses of lava. Such an idea was heresy, but a heresy increasingly tolerated. It was the year 1776 famous for the American Declaration of Independence that saw the first publication of a paper (by James Kerr) suggesting a kind of declaration of independence in geology.

Does not this discovery of a property in glass to crystallize reflect a high degree of probability on the opinion that the great native crystals of basaltes, such as those which form the Giant's Causeway, or the Pillars of Staffa, have been produced by the crystallization of a vitreous lava, rendered fluid by the fire of volcanoes?

The pottery manufacturer Josiah Wedgwood (who was trying to make porcelain) even became involved in scientific experiments to determine whether the Earth's crust might have been formed from lava flows. And by 1785, James Hutton the geologist presented his revolutionary new theory of the Earth based on these ideas, which we remark elsewhere (page 182) had been



ABOVE • A duck-shaped porcelain water-dropper from the 18th century. British Museum, London.





Lotus Pond, the reverse of the Plate, from the Ming Dynasty (1368-1644) of the Ching Dynasty (1644-1911).

which has just taken place to the two men who are sitting playing the game of go, more commonly known by its Japanese

The plate has a green glaze used for the ground and the sky is depicted in a light blue color.

arrived at by the Chinese centuries before. And so, one of the great scientific advances in the Western world took place as a direct consequence of the attempts by Europeans to find the secret of porcelain manufacture. It is highly ironical that this great advance itself was merely a late duplication of an indigenous Chinese idea (a secret unknown to Europeans, and soon surpassed in the West

in Europe, porcelain was finally developed in the eighteenth century, some 1700 years after the Chinese. Previous European 'porcelains' were not true ones; they would melt if placed in ovens at the temperatures used to fire Chinese porcelain. At last the goal had been achieved and one of the greatest secrets of China fell to a sustained Western onslaught which had lasted for centuries.

## BIOLOGICAL PEST CONTROL

Mandarin oranges are ferociously attacked by black ants, caterpillars and other predators, and if this is not somehow controlled, no orange will be left intact on a tree. For 1700 years, the Chinese have controlled insect pests by biological means, using one insect to kill another. This was only really been practised in the West in the twentieth century. Perhaps the most striking and important Chinese use of biological pest control was in the use of yellow citrus killer-ants to protect the mandarin trees. Here is how a text of 304 AD *Records of the Plants and Trees of the Southern Region*, by Hsi Han, describes the use of the carnivorous yellow ants:

The mandarin orange is a kind of orange with an exceptionally sweet and delicious taste. The people of Chiao-Chih sell in their markets [carnivorous] ants in bags of rush matting. The nests are like silk. The bags are all attached to twigs and leaves which, with the ants inside the nests, are for sale. The ants are reddish-yellow in colour, bigger than ordinary ants. These ants do not eat the oranges, but attack and kill the insects which do. In the south, if the mandarin orange trees do not have this kind of ant, the fruits will be damaged by many harmful insects, and not a single fruit will be perfect.

The killer ants employed for this purpose are still used. They have been identified by Western entomologists as *Oecophylla smaragdina* (see Plate 69 (right)). Originally, whole nests of citrus ants were sold, as we have seen, but later they were caught by being trapped in bladders. This is described by Chuang Chi Yu in his *Miscellaneous Random Notes* of 1130:

In Kuangchow there is a shortage of arable land so people often plant mandarin oranges and chili oranges for income, but they suffer considerable losses caused by small insects feeding on the fruits. However, if there are many ants on the trees then the injurious insects cannot survive. Fruit-growing families buy these ants from vendors who make a business of collecting and selling such creatures.

They trap them by filling hogs' or sheep's bladders with fat and placing them with the cavities open next to the ants' nests. They wait until the ants have migrated into the bladders and then take them away. This is known as 'rearing orange ants'.

But how could the ants spread easily through an entire orange grove? Bridges of bamboo have traditionally been stretched between the orange trees to allow the citrus ants to move from one tree to another throughout the grove. This practice continues today. They were in use at least four hundred years ago, as we learn from Wu Chen Fang's *Miscellaneous from the Southern Regions* of 1600:

In Li-chih village, west of Kaochow, oranges and pomelos are important secondary crops. Trees planted on several *mu* (each 6.6 acres) of land are connected to each other by bamboo strips to facilitate the movement of the large ants which ward off insect pests. The ants build



ABOVE (69) Carnivorous citrus ants (*Oecophylla smaragdina*) have been used for seventeen hundred years as a means of biological pest control to protect their mandarin orange groves from predators. Some of the ants here hold leaves for a nest while others chew their way through silk from larvae.

nests among the leaves and branches in the hundreds and thousands. A nest may reach the size of a ton (1.6 gallons).

This biological pest control first came to Western attention when a paper on the subject was published in the *American Horticulturist* on 4 April 1882. H. M. Clark, who was then in charge of the Florida citrus groves, reported that a citrus canker occurred in the Florida citrus groves in the 1910s that a plant physiologist went to China by the US Department of Agriculture in 1917 to research for canker-resistant oranges and discovered the citrus ants. The study of the ants in Western was interrupted by the Japanese invasion in 1937. Then, in 1950, the Chinese scientist Chen Shou-shan recommended a renewed study of the ants. The study of the ants continues to this day.

## THE UMBRELLA

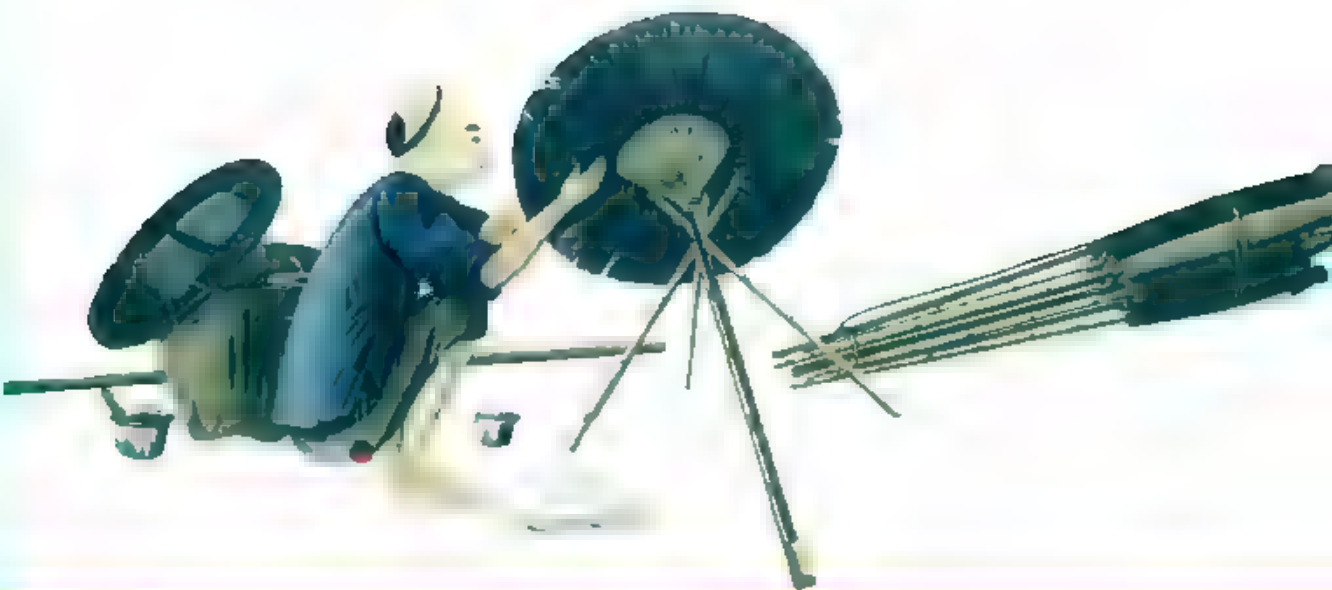
Though we know it was invented in China towards the end of the fourth century AD, an earlier type made of silk had been used as a chariot rain-cover in the rain for many centuries. The umbrella proper appeared during the Wei Dynasty (220-270 AD). Instead of silk it used a special kind of heavy paper made from the bark of the mulberry tree (see the account of paper page 92), and was used as protection from both rain and sun.

The Wei emperor used a white flow umbrella before he became emperor and when he became emperor he used a black one. In the Tang Dynasty (618-907 AD), the scholar Han Yu (768-824 AD) wrote a poem about the umbrella. In the Song Dynasty (960-1279 AD), the scholar Wang Yang-ming (1471-1529 AD) wrote a poem about the umbrella. The umbrella is a pole like the spokes of an umbrella.



ABOVE (70) Photograph taken by Cecil DeSilva, 1950. (Source: *Journal of the Royal Asiatic Society*, 1950, p. 100)





**ABOVE** A person in the thirteenth century painting or assembling an umbrella with a pile of rolled umbrellas on the right. The umbrella was invented in China towards the end of the fourth century AD, probably inspired by the silk canopies placed over chariots during the Han Dynasty (207 BC–220 AD). (Victoria and Albert Museum, London)

**BELOW** A man holding up thirteenth-century umbrellas. From *The Thousand Golden Verses* by Meng Yixun, Emperor of the Southern Song, and appears to be unpublished. Each image is from a different *Illustration Onstage* the watermark of which names see another reproduction from a 19th-century page 7. (Cambridge University Library)



By the fourteenth century silk umbrellas must have been available as well as the oiled-paper ones, for in 1368 an imperial decree announced that silk umbrellas were to be reserved for the exclusive use of the royal family. This law does not say a lot for the Ming Dynasty, which promulgated it, but perhaps the ruling cliques thought that people with silk umbrellas were getting above themselves. The umbrella seems at this time to have taken on quite a symbolic significance. It was used in ceremonies, and the emperor would give special signed umbrellas to his most trusted officials.

How and when the umbrellas came to Europe is apparently not known. Perhaps paper umbrellas sold in China made their way to Europe, where the design was copied and its origin soon forgotten.

## MATCHES

### THE INVENTION

Every time we strike a match, we are using a Chinese invention. The first version of a match was invented in the year 577 AD by impoverished court ladies during a military siege, in the short-lived Chinese kingdom of the Northern Ch'i. (This kingdom was presided over by the psychopathic ruler described at greater length in the account of man-flying kites on page 191.) Hard-pressed during the siege, they must have been so short of

under that they could otherwise not start fires for cooking, heating, etc. The neighbouring kingdoms of the Northern Chou and the Ch'en agreed to attack the Northern Ch'i – which consisted of the entire North China plain – from both sides at once. The attack was so successful that the Ch'i were annihilated. Later, the two conquering forces warred against one another and were in turn absorbed in the next unification of China under the Sui Dynasty (581–617 AD).

Early matches were made with sulphur. A description is found in a book entitled *Records of the Unworldly and the Strange* written about 950 by T'ao Kuo.

If there occurs an emergency at night it may take some time to make a light to light a lamp. But an ingenious man devised the system of impregnating little sticks of pinewood with sulphur and storing them ready for use. At the slightest touch of fire they burst into flame. One gets a little flame like an ear of corn. This marvellous thing was formerly called a 'light-bringing slave', but afterwards when it became an article of commerce its name was changed to 'fire-inch-stick'.

There is no evidence of matches in Europe before 1530. Therefore, the Chinese were using them for just short of a thousand years before they arrived in Europe. Matches could easily have been brought to Europe by one of the



RIGHT (73) A late eighteenth-century painting of a boy selling joss-sticks and matches (Victoria and Albert Museum, London)

Europeans travelling to China at the time of Marco Polo, since we know for certain that they were being sold in the street markets of Hangchow in the year 1270 or thereabouts. This is recorded in one of the six-and-a-half thousand ancient topographical books which survive about regions and cities of China. *Institutions and Customs of the Old Capital (Hangchow)*, which dates from 1270 and recounts events from 165 onwards. Since the earliest European matches used sulphur, the invention seems to have been directly transmitted by a European traveller. Sulphur is still used in matches today, though it was in 1830 that Saunier in France and Karmischer in Germany made the breakthrough which gave us the modern match, by using a compounded mixture of yellow phosphorus, sulphur and potassium chlorate.

It is easy for us to take for granted such small daily necessities as matches. After all, they are cheap, used once and thrown away. But where would we be without them? Many adults in today's developed world carry with them, and unknown as they go about their daily business, small tokens of the inventiveness of a group of anonymous Chinese women of the sixth century – the products of their desperation in the face of starvation and eventual violent death.

## CHESS

NEEDHAM

Although most historians of chess believed that the game was invented in India, Needham has been able to establish that it originated in China. Chess took its present form as a militaristic combat game in India, but its origins were connected with astrology, magnetism and divination. According to Needham 'The battle element of chess seems to have developed from a technique of divination in which it was desired to ascertain the balance of ever-contending *yin* and *yang* forces in the Universe (sixth century AD China whence it passed to seventh-century AD India, generating there the recreational game).

The surviving form of 'Chinese chess' played today is not the same either as the ancient Chinese form or as modern Western chess. This has led various scholars to overlook the game's Chinese origins. For instance, A. E. J. Mackett-Beeson, in discussing the history of chess pieces in 1968, remarks 'Although the Chinese claim to have invented chess some 2072 years ago during the Hansing campaign



ABOVE (74) A set of seventeenth-century Chinese chessmen, made of ivory pieces set into dark heartwood/ebony, kept in an ebony box (with a sliding lid). Chinese chessmen were not carved as figures but were always disc-shaped. One side of the disc was painted red, the other's painted black. No Chinese chessboard of this age appears to survive, and it is believed that only one other set of chessmen similar to this exists (represented in A. E. J. Mackett-Beeson, *Chessmen*, New York, 1968, see Plate 89) (Collection of Robert Temple)

*choke-choo-hang-ki* [the name applied to the Chinese game, is merely a variation of *shatranj*, the medieval game of India'. This modern Chinese chess was a reintroduction to China, and was indeed influenced by the Indian game, which had originally come from Chinese sources and been altered in India.

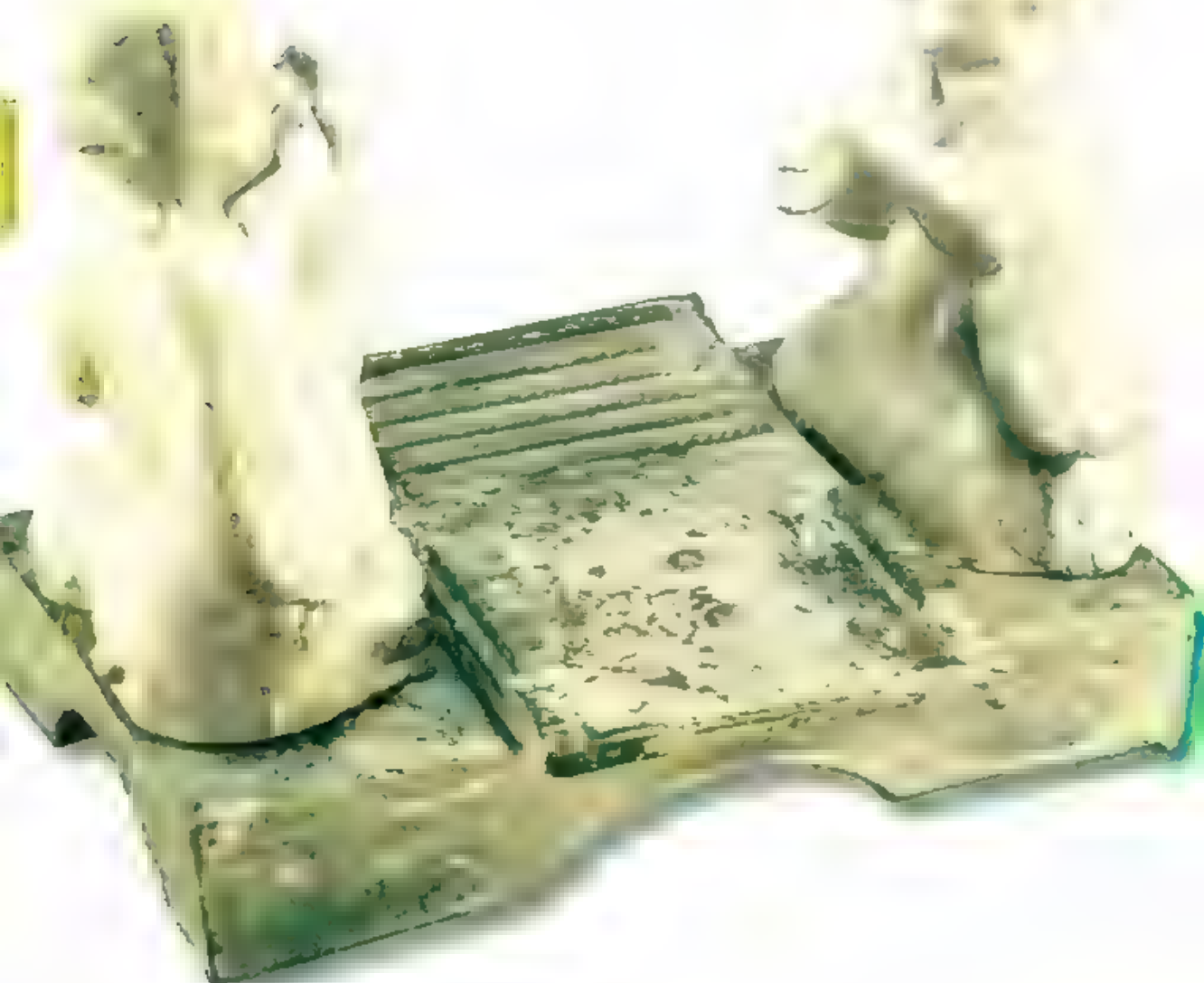
In modern Chinese chess the board has the usual sixty-four squares. Over the middle of the board, however, is a river, which originally symbolized the Milky Way, across which some of the pieces cannot move. For instance, each player has two 'men' called 'horses'. These move just as our knights do, but they cannot cross the river. On the other hand, each player has two chariots which are equivalent to our rooks and these can cross the river. The king moves one space at a time as our king does, but is confined to a fortress consisting of four squares, king one and two and queen one and two. Each player has only five pawns; they can cross the river but do not queen. There is the further amusing curiosity that each player has two pieces called 'rocket boys' which do not capture the piece directly ahead but instead capture the one directly beyond it, as if they had fired artillery over the head of the first piece.

Needham believes that the opposing kings of chess were originally the Sun and Moon. The planets were represented by pieces divided between the two sides. The pawns, at fourteen a side, were the twenty-eight equatorial constellations. The 'rocket boys' Needham thinks, 'may well have been comets'. He quotes an 'Essay on Chess' by the historian Pan Ku of the first century AD:

Northerners call chess (*chi'i*) by the name of *chi*. It has a deep significance. The board has to be square, for it signifies the Earth, and its right angles signify uprightness. The pieces of the two opposing sides are yellow and black, this difference signifies the *yin* and the *yang* – scattered in groups all over the board, they represent the heavenly

bodies. These significances being manifest it is up to the players to make the moves, and this is connected with kingship. Following what the rules permit, both opponents are subject to them – this is the rigour of the Tao.

BELOW (75) A earthenware comb model on the second century AD showing two men playing the board game *fur-pu*. Six learned Sicilians, whose work goes back to the third century BC, at least. Needham believes this game to be one of several antologues board games which together led to the development of chess and which were introduced into India to provide the model for the game of chess. (British Museum, London)



In ancient China, there was a wide variety of chess games. Needham stresses that, 'The Chinese language makes no distinction between these forms and the war-game of chess itself, both being expressed by the character *ch'i*.' So, although the forms of chess vary enormously, not only do the Chinese designate them all by the same name, but they may clearly be seen to be related. It was not the specific rules, number of men, and modes of play that were the main point to the game, but the magical purpose of foretelling future events.

As for a date for the Chinese origins, Needham says, 'The oldest Chinese name for a chess-like game played on a board is *chi*, to which there are two references in Mencius (fourth century BC). An improved version known as 'image-chess' seems to have been invented in the sixth century AD. At that time, a cavalry general named Yu Hsin wrote an essay entitled 'The Image-Chess Game'. An emperor or one of his advisers, actually seems to have invented this later form of chess. As a book entitled *Red Lead Record* tells us

Tradition handed down says that image-chess was invented by the Emperor Wu of the Northern Chou Dynasty [561-78 AD]. According to the [official history] it was in 569 AD that the Emperor finished writing his *Image-Chess Manual*. He assembled all his officials in a palace hall and gave lectures to them about it... in image-chess images of the Sun, Moon, stars, and constellations were used... it was necessary to have scholarly commentaries on it, and lectures to the hundred officials.

Just as modern Chinese chessmen are often flat wooden discs, so many ancient Chinese chessmen are simply bronze discs bearing written characters saying what they represent. Several examples are in the British Museum, where they have been mislaid and forgotten in recent years. Some have pictures of constellations. Many have been found with the picture of the Great Bear (the Plough or Big Dipper), which, as we see in the account of the compass (page 162), was represented on the lodestone pointer in early Chinese compasses. Although the Chinese origin was forgotten, the astrological importance of chess was realized by the Indians and Arabs. Indeed, there is a thirteenth-century Latin poem which gives

the astrological symbolism of each chess piece, showing that this knowledge still existed at that time even in Europe.

The earliest European references to chess date from about 1010 in the Pyrenees. The game seems to have entered Spain through contact with the Arabs, who obtained it from India, where it was known as *chaturanga* from the early seventh century AD.

In summarizing the unique factors in China which enabled a game such as chess to develop, Needham says that the important thing to notice is that in China, and in China alone, on account of the dominance of the *yin-yang* theory of the macrocosm, could a divination technique or "pre game" have been devised which was both astrological and yet had a sufficient combat element to enable it to be vulgarized into a purely military symbolism.

## BRANDY AND WHISKY

SEVENTH CENTURY AD

Readers will be doubly surprised to learn that the Chinese invented brandy, because though the fact in itself is impressive enough, it is not widely realized that the Chinese drank wine made from grapes at all, much less distilled it into brandy. Grape wine was being drunk by the second century BC at the latest in China, since we begin to have textual evidence of it by then. The envoy and traveler Chang Ch'ien brought good wine grapes (*Vitis vinifera*) back with him from Bactria about 126 BC. Before the importation of those grapes, however, there were wild vine species, or 'mountain grapes' which were already being used for wine, namely *Vitis thunbergii* and *Vitis filifolia*. Wine made from them is mentioned before Chang Ch'ien in the book called *Classical Pharmacopoeia of the Heavenly Husbandman*.

The fact that an even stronger drink could be obtained from wine first came to attention through the production of 'frozen-out wine' among the Central Asian tribes. No doubt because of the extremely cold conditions in which these people lived, it was often noticed that wine and other fermented beverages (such as fermented mare's milk) when frozen would have small amounts of unfrozen liquid in the middle. This was the alcohol, which had remained liquid while the water in the drink had frozen. It was presumably this to which Chang Hui was referring in 290 AD in his book *Records of the*





*Illustration of Things* when he said 'The Western regions have a wine made from grapes which will keep good for years as much as ten years, it is commonly said, and if one drinks of it, one will not get over one's drunkenness for days.'

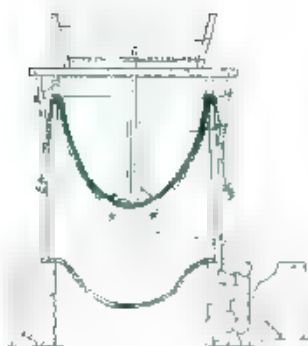
The tribal peoples of Kao-Chang (Turfan) presented 'frozen-out wine' as tribute to Chinese emperors more than once, commencing in 520 AD. The freezing-out technique for obtaining spirits eventually became a test applied to distilled spirits. Yeh Tzu-Chi tells us in his book of 1378, entitled *The Book of the Finding-like-Glass Master*, that people would test their spirits by leaving them outside in the winter to freeze. If they did not freeze they knew the distilled spirits were pure and unadulterated, but if they partly

froze, they knew they were watered-down or otherwise impure. 'Frozen-out wine' is not mentioned in Europe until Paracelsus, in the *Archidoxus* written in 1527 but not published until 1570. Paracelsus's remarks caused something of a sensation among Europeans. So unfamiliar was the phenomenon he described that Francis Bacon in 1620 wrote, half incredulous 'Paracelsus reporteth, that if a glass of wine be set upon a terras [terrace] in bitter frost, it will leave some liquor unfrozen in the centre of the glass, which excelleth *spiritus vini* drawn by fire' (For by then, distillation of alcohol was known.)

Distilled wine, or brandy was known in China as 'burnt wine'. The English word 'brandy' itself comes from the Dutch *brandewijn* ('burnt wine'). And the German word for brandy or spirits is *Brantwein* ('burnt wine'), while a distiller is a *Brantweinbrenner* ('burnt wine burner'). It is possible that all of these words result from a direct translation of the Chinese

LEFT (76). A late eighteenth-century painting of a small still in operation. The tube carrying the distilled substance leads to a receptacle at bottom left (Victoria and Albert Museum, London).





ABOVE, FIG. 5: A diagram of a Chinese still from *China as Hurk* by R. J. Hommel. The distilled substance, which can be any of a number of substances, including brandy or whisky, is drawn off by the side-tube (2) at the bottom, into a cool vessel. The fire and grate (6) are underneath a cast-iron bowl (3) which forms the bottom of the still and is filled with the mash to be distilled. At the top is a wooden reservoir of cold water (5), supported by a wooden framework (7) and in the middle is a powder cooling reservoir (4). A central pipe (1) lets cold water flow down into the cooling reservoir or condenser at the still's base.

*stian chiu* ('burnt wine') by Dutch sailors. If not, they are a curious coincidence indeed.

We have a description of the making of 'burnt wine' brandy by the author Li Shi-h-Chen, in his book *The Great Pharmacopoeia*.

Strong wine is mixed with the fermentation residues and put inside a still. On heating, the vapour is made to rise, and a vessel is used to collect the condensing drops. All sorts of wine that have turned sour can be used for distilling. Nowadays in general glutinous rice or ordinary rice or glutinous millet or the other variety of glutinous millet or barley are first cooked by steaming, then mixed with ferment and allowed to brew in vats for seven days before being distilled. The product is as clear as water and its taste is extremely strong. This is distilled spirits (*chiu lu*).

Here we have a description not only of brandy, but of various kinds of whisky. This passage was published in 1596, but is merely one of the clearest passages describing distilled spirits which had been made in China from the seventh century AD. Many passages are rather obscure and coy because of the problems over the excise duty on spirits which was evied by

the government. The Chinese were the world's first large-scale bootleggers. The Emperor Wang Mang (who reigned 9–23 AD) nationalized the fermentation and brewing industries. So strict were the taxes and the prohibitions against private manufacture of wine or spirits during the Northern Wei Dynasty (386–535 AD) that the penalty for private brewing was death. People had to evolve a series of 'cover-names' for brandy and whisky just as in modern times the terms 'hooch', 'white lightning', and 'moonshine' have developed. One type of drink was called 'the Sage', another was called 'the Worthy'. And in the eleventh century, if you wanted to offer your guests a drink of your own moonshine, you would say, 'Have a drop of 'wisdom soup'.

The distillation of alcohol in the West was discovered in Italy in the twelfth century. Spirits came to be known as *aqua ardens* ('the water that burns') or *aqua vitae* ('the water of life'). By the thirteenth century, several writers mention it, and talk about brandy ten times distilled, until it reached what must have been about 90 per cent alcohol. The word 'alcohol' (which derives from Arabic) was introduced by Paracelsus in the sixteenth century. By 1559, *aqua vitae* was being praised by Conrad Gesner in terms which we can all find familiar: 'Yea, it changeth the affections of the minde, it taketh away sadness and pensiveness, it maketh men merry, witty, and encreaseth audacity.' And in this increased audacity, wit and merriment, the Chinese were in advance of Europeans by about five hundred years.

## THE MECHANICAL CLOCK

BY J. D. C. NICHOLSON

The difficulty in inventing a mechanical clock was to figure out a way in which a wheel no bigger than a room could turn at the same speed as the Earth, but still be turning more or less continuously. If this could be accomplished, then the wheel became a mini-Earth and could tell the time. For, after all, the time is nothing more nor less than how far the Earth has turned today.

Accomplishing this mechanical feat was one of the greatest steps forward of the human race. Where would we be today without clocks? The mechanical clock was invented in China in the eighth century AD. But still in 1271, Robertus Anglicus in his commentary on the *Sphere* of Sacrobosco tells us that in Europe 'artificers are trying to make a wheel





Chinese inventions of gunpowder segments arch  
bridges, cast iron and printing

Apart from the fact that the Chinese are obviously inventive people, what other factors can account for the fact that they were the first to invent mechanical clocks? Was there some special reason why they urgently needed to know the hours of the day and the days of the year with a precision not required in Europe? The answer is yes, but few could possibly

The Chinese emperor was a cosmic figure the equivalent of Earth of the Pole Star. His every move was regulated in conjunction with astrology. His heir was not necessarily his eldest son. Many examples in Chinese history exist of fourth sons or other lesser offspring, being selected as the next emperor. How, then, was it determined who should be the heir? Part of the process of selection involved the astrological computation of the moment of the child's conception (since in China horoscopes commence at the estimated time of

conception rather than at birth. And the moments when conception might take place were carefully set as do for the highest ranking wives and concubines of the emperor to sleep with him. Access to the emperor's person had to be precisely timed in order for this to work properly. From the *Recent Institutions of the Chou Dynasty* compiled about the second century B.C., we find the following astonishing passage about the emperor's sex life:

The lower-ranking women come first, the higher-ranking come last. The assistant concubines, eighty-one in number, share the imperial couch nine nights in groups of nine. The concubines, twenty-seven in number, are allotted three nights in groups of nine. The nine spouses and the three consorts are allotted one night to each group, and the empress also alone one night.

[illegible]

On the fifteenth day of every month the sequence is complete, after which it repeats in the reverse order.

The emper<sup>or</sup> known as the Son of Heaven, was full of a powerful *yang* force which was the essence of masculinity. But he needed to be fed with a matching *yin* force, the essence of femininity, to achieve a balance. At the time of the full moon, when the *yin* force was at its peak, the empress would sleep with the Son of Heaven, feeding him with her powerful *yin*. This would be the most propitious time for a conception to take place. The lesser women, during the time of the Moon's waning, had to sleep with the emperor in groups in order to pool their respective *yin* forces to overcome the lack of the Moon's strength. For most of the nights of his life, therefore, the emperor slept with nine women at a time.

If a like y<sup>oung</sup> lad were to be chosen to be the next emperor, the astrologers would go back to the precise time of his conception, plot the stars which were dominating and consider any comets or novae or other astronomical phenomena. If the astrological configurations were indicative of a strong leader, a valiant warrior, or whatever, this would weigh in the young prince's favour. But the eldest son might well have been born under the influences of stars concerning death or disaster. So he would be ruled out quite early on.

But let us see what the situation was at about the time when the mechanical clock was invented in China. Was the succession principle operating very well? In the ninth century P'u Hsing-Chien bewails the chaos of the system. We read in his Poetical Essay of the Supreme Joy:

Nine ordinary companions every night, and the empress for two nights at the time of the full moon — that was the ancient rule, and the secretarial ladies kept a record of everything with their vermilion brushes. But alas, nowadays, all the three thousand palace women compete in confusion.

Clearly the succession to the throne was in peril. Bad princes might be chosen. The timing of their conceptions was not being noted properly. Time for a clock to be invented! And in 725 AD this was done.

The Chinese did not invent the first clock of any kind, merely the first mechanical one. Water clocks

had existed since Babylonian times, and the earliest Chinese got them indirectly from that earlier civilization of the Middle East, just as they got much of their earliest forms of astronomy from them. The Chinese certainly did invent improved water clocks of various kinds, including a stop-watch portable one which used mercury rather than water and measured small periods of time. It used weighted balances, or steelyards, rather than just a rising indicator in a bucket as water flowed in and flowed it up. But these were improvements of an invention which was not originally Chinese. Nor did the Chinese invent the clock dial. That was an invention of either the Greeks or the Romans, and is mentioned by the architectural writer Vitruvius in the first century BC.

The world's first mechanical clock was built by the Chinese Taoist Buddhist monk and naturalist Su Song. This was actually an astronomical instrument which served as a clock, rather than simply a clock. A contemporary text describes it:

[it] was made in the image of the round heavens and on it were shown the lunar mansions in their order, the equator and the degrees of the heavenly circumference. Water, flowing into scoops, turned a wheel automatically, rotating it one complete revolution in one day and night [24 hours]. Besides this, there were two rings fitted around the celestial sphere outside, having the sun and moon threaded on them, and these were made to move in circling orbit. Each day as the celestial sphere turned one revolution westwards, the sun made its way one degree eastwards, and the moon 13 1/2 degrees eastwards. After twenty-nine rotations and a fraction of a rotation of the celestial sphere the sun and moon met. After it made 365 rotations the sun accomplished its complete circuit. And they made a wooden casing the surface of which represented the horizon, since the instrument was half sunk in it. It permitted the exact determinations of the time of dawns and dusks, full and new moons, tarrying and hurrying. Moreover, there were two wooden jacks standing on the horizon surface, having one a bell and the other a drum in front of it, the bell being struck automatically to indicate the hours, and the drum being beaten automatically to indicate the quarters.

All these motions were brought about by machinery within the casing, each depending on wheels and shafts, hooks, pins and interlocking rods, stopping devices and locks checking mutually (i.e. the escapement)

Since the clock showed good agreement with the Tao of Heaven, everyone at that time praised its ingenuity. When it was all completed in 725 AD, it was called the 'Water-driven Spherical Birds'-Eye-View Map of the Heavens' and set up in front of the Wu Ch'eng Hall of the Palace to be seen by the multitude of officials. In 730 AD candidates in the imperial examinations were asked to write an essay on the new astronomical clock. The text continues:

But not very long afterwards the mechanism of bronze and iron began to corrode and rust, so that the instrument could no longer rotate automatically. It was therefore relegated to the museum of the College of All Sages and went out of use.

From this description we may see that the first mechanical clock was a transition from the water clock to the purely mechanical clock of Europe which used no water power anywhere. However this does not mean the clock of I-Hsing was a water clock by any means. What it means is that the first mechanical escapement for the clock was worked not by a falling weight or by springs but by water power. This is quite a different thing from having an actual water clock whose time indicator rises with the level of water (or mercury) in a tank. It is not unreasonable that in developing a mechanical clock, the Chinese turned to water as a power source, since all previous clocks had been water clocks and the association of ideas was natural to them. The perpetual flow of water was likened to the perpetual turning of the heavens. As Su Sung wrote in 1092, in speaking of his own improved clock:

The principle of the use of water power for the driving mechanism has always been the same. The heavens move without ceasing and so also does water flow and fall. Thus if the water is made to pour with perfect evenness then the comparison of the rotary movements of the heavens and the machine will show no discrepancy or contradiction, for the unceasing follows the unceasing.

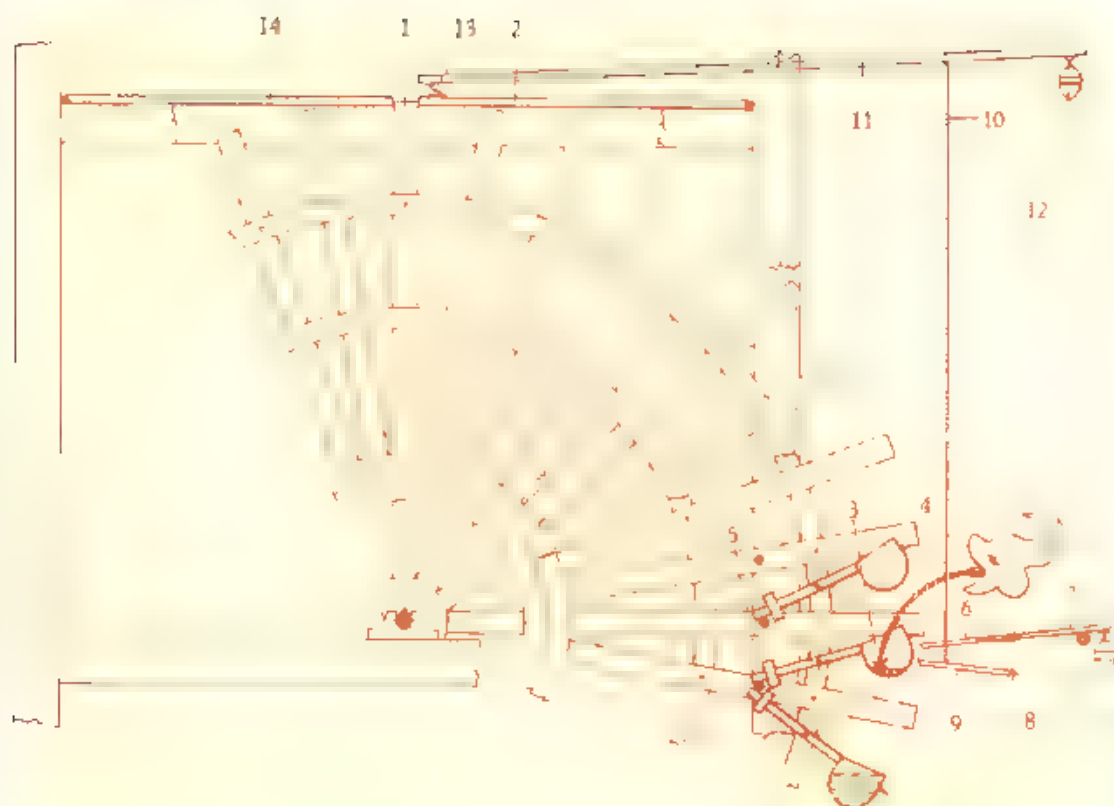
The actual workings of the clock of I-Hsing consisted of a vertical water wheel which instead of paddles (such as are turned by a rushing stream) had cups at the ends of the blades. These cups were filled by water dripping from a water clock. I-Hsing's clock was therefore a mechanical clock driven by a water clock. When one of the cups was sufficiently full it would weigh enough to turn the great wheel by one notch, overcoming the resistance of a restraining tooth which had held the wheel still while the cup filled. Various gear arrangements would then transmit the movement to the time indicators, etc. As the ancient text tells us, shafts, hooks, pins, and interlocking rods were all part of the apparatus. Some idea of what these may have been like may be gathered from the fuller description of Su Sung's clock which we shall see opposite (See Figure 6.)

This clock of I-Hsing would have been a poor time-keeper, moving jerkily and representing more the first realization of a wonderful idea than a superb piece of machinery. It was because of the enormous promise that this clock offered for future improvements that contemporaries would have had every reason to be excited. And its promise was more than borne out in succeeding centuries. I-Hsing himself died only two years later and was unable to construct a second generation model.

I-Hsing's clock was, like water clocks, subject to the vicissitudes of the weather. In order to keep the water in them from freezing, torches generally burnt beside them. This was of course not necessary for the small mercury clocks, as mercury does not freeze at any temperature likely to occur in the Earth's weather. Therefore, in the next great clock of which we have accounts in China, mercury was substituted for water because of the freezing problem. This clock was built by Chang Ssu-Hsun in 976 AD. It represented a considerable elaboration and improvement over I-Hsing's machine though the latter no longer existed and had been lost even before the end of the Tang Dynasty in 906.

Chang Ssu-Hsun's clock was apparently much larger than I-Hsing's. It was certainly far more complex. The dynastic history of the time describes it:

a tower of three storeys each over ten feet in height, within which was concealed all the machinery. It was round at the top to symbolize the heavens and square at the bottom to symbolize the earth. Below there was set up the



lower wheel, lower shaft, and the framework base. There were also horizontal wheels, vertical wheels fixed sideways, and slanting wheels; bearings for fixing them in place; a central stopping device and a smaller stopping device [i.e. the escapement] with a main transmission shaft. Seven jacks rang bells on the left, struck a large bell on the right, and beat a drum in the middle to indicate clearly the passing of the quarter-hours. Each day and night [i.e. each 24 hours] the machinery made one complete revolution, and the seven luminaries moved their positions around the ecliptic. Twelve other wooden jacks were also made to come out at each of the double-hours, one after the other, bearing tablets indicating the time. The lengths of the days and nights were determined by the varying numbers of the quarters passing in light or darkness. At the upper part of the machinery there were the top piece, upper gear wheels, upper stopping device [escapement], upper anti-recoil ratchet pin, celestial ladder gear case [possibly the first chain drive in history, or

ABOVE FIG. 6. John Cambridge's diagram of the water wheel escapement of Su Sung's clock. The buckets on the ends of the spokes are shown for the three lowest spokes: the first empty; the second filling from the spout of the tank; and the third full, upon its rising further it would empty into a trough. When the bucket was filled it depressed a lever which pulled the long chain (10) which then pulled the upper balancing lever (11) which was counterweighted (12). When this happened, the upper lock (2) was jerked away, enabling the wheel to turn. There was another upper lock (4) to prevent recoil of the wheel. Each bucket had its own counterweight (5) to regulate the exact amount of water necessary for tipping the bucket downwards to operate this series of movements.

otherwise this was invented shortly afterwards by Su Sung for his clock], upper beam of the framework, and the upper connecting-rod. There were also on a celestial globe the 365 degrees to show the movements of the sun, moon, and five planets, as well as the Purple Palace [north polar region], the lunar mansions in their ranks and the Great Bear, together with the equator and ecliptic which indicated how the changes of the advance and regression



of heat and cold depend upon the measured motions of the sun. The motive power of the clock was water, according to the method which had come down from Chang Hien in the Han Dynasty through I-Hsing . but .. as during the winter the water partly froze and its flow was greatly reduced, the machinery lost its exactness, and there was no constancy between the hot and the cold weather. Now, therefore, mercury was employed as a substitute, and there were no more errors.

All of these efforts were preparatory for the greatest of all Chinese medieval clocks, the 'Cosmic Engine' of Su Sung, built in the year 1092. Su Sung's clock is known in considerable detail due to the miraculous preservation over nine centuries, of his book *New Design for a Mechanized Armillary Sphere and Celestial Globe*. This work describes the design and construction of the great clock in full detail. Some drawings in the book have recently been discovered to be those of Chang Ssu-Hsun in 976, to whose earlier clock Su Sung's must have borne a closer resemblance than had been thought until now. Modern working models of the clock have been constructed, and in Plates 77 and 78 (pages 111-118) may be seen one at the Science Museum in London. These models are, of course, based on the full descriptions and drawings in Su Sung's book.

Su Sung's clock was actually an astronomical clock tower more than 30 feet high, like the previous one of Chang. But on top of Su Sung's tower was additionally a huge bronze power-driven astronomical instrument called an armillary sphere (see page 38), with which one could observe the positions of the stars. A celestial globe inside the tower turned in synchronization with this sphere above, so that the two could constantly be compared. We are told that the observations made on the demonstrational globe inside and by the observational sphere above agreed like the two halves of a tal y'

On the front of the tower was a pagoda structure of five storeys, each having a door through which mannikins and jacks appeared ringing bells and gongs and holding tablets to indicate the hours and other special times of the day and night. All of these time-indicators were operated by the same giant clock machinery which simultaneously turned the sphere and the globe.

This machinery consisted, as usual, of a huge vertical water wheel with scoops at the end of each

blade, into which water dripped from a water cock. Every time the wheel turned one notch upon the filling of a scoop, there was a ratchet pin which came down to prevent the wheel recoiling backwards. As for the forward motion of the wheel, it went forward one scoop every quarter of an hour. Needham describes the machine as follows:

The wheel was checked by an escapement consisting of a sort of weigh-bridge which prevented the fall of a scoop until full, and a trip-lever and parallel linkage system which arrested the forward motion of the wheel at a further point and allowed it to settle back and bring the next scoop into position on the weigh-bridge. One must imagine this giant structure going off at full-cock every quarter of an hour with a great sound of creaking and splashing, clanging and ringing; it must have been very impressive, and we know that it was actually built and made to work for many years before being carried away into exile.

In fact, Su Sung's clock ran from 1092 until 1226 when the capital, Kaifeng, was lost by the Sung Dynasty. The clock was then dismantled, moved to Peking, and reassembled there, where it ran for 40 years further. The clock had previous vicissitudes which shed light upon the spirit of the times. Members of political factions opposed to the one of which Su Sung had been a member (he was a conservative) wanted to destroy his clock for political reasons. We are told this by Chu Pen in his book *Talks about Bygone Things beside the Winding River* (written in Honan) of 1440:

But at the beginning of the Shao-Sheng reign-period [1094 AD] Ts'ai Pien, Minister of State, suggested that the armillary clock of Su Sung ought to be destroyed as something which belonged to the previous Yuan-Yü reign period [of only two years before]. At that time Ch'ao Mei Shu was Assistant Director of the Imperial Library, and as he greatly admired the accuracy and beautiful construction of Su Sung's instruments, he struggled to argue against Ts'ai Pien, but at first his efforts proved unsuccessful. However, he sought the help of Lin Tzu-Chung who talked to Chang Tun, the Prime Minister, and thus the destruction of the clock

was averted. However, after Ts'ai Chung and his brother came into power nobody dared to say anything to prevent Su Sung's machinery being torn down. How shameful!

Thus do we see how personal envy and political disagreement between a liberal and a conservative could result in the destruction of one of the greatest mechanical contrivances in the history of mankind, within only a few years of its construction. But by the strenuous efforts of generations of scholars, Su Sung's book with its diagrams and detailed text survived intact from 1094 until the present time, when Joseph Needham has translated and published it in his book *Heavenly Clockwork*.

Su Sung's clock was possibly the greatest mechanical achievement of the Middle Ages anywhere on the globe (for further details of its working see pictures and captions accompanying this text), knowledge of its principles spread to Europe leading to the development of mechanical clocks in the West two centuries later.

## PRINTING

WOOD AND PAPER IN CHINA

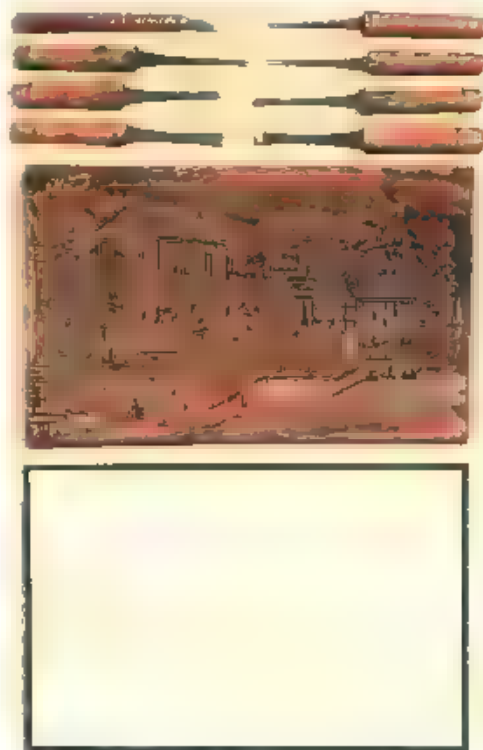
Woodblock printing on paper and ink arose in China around the seventh century AD and actual specimens survive from the eighth century. But the origins of printing go even further back into the distant past: there were many related techniques which preceded printing.

First, seals were used to stamp impressions of names, and even as many as a hundred Chinese characters at once, onto various surfaces. The Chinese got the idea of seals from the Middle East, where the Babylonians and Sumerians used them in profusion long before Chinese civilization arose. Cutting a seal is rather like cutting a woodblock in printing, and it is easy to see how the latter technique derived its inspiration from the former. But that is quite different from saying that the idea of using seals led to printing. This did not happen with the Sumerians or Babylonians. It was the need to make enormous numbers of copies of certain writings which led the Chinese to invent ways of mass-producing written material, on paper, a substance which already existed in China (see page 92).

Another proto-printing technique in China was connected with bronze casting. Chinese characters

were often incorporated in the designs on Chinese bronzes. But a close study of these bronzes shows that the characters were set into the moulds either separately or in small groups. (This was especially the case when the 'lost wax' method of bronze casting was used.) We therefore find bronze inscriptions using the forerunner of movable type as early as the seventh century AD. Individual typesetting was therefore in progress nearly two millennia before it was adopted for printing.

Other means of mass-producing written scriptures and sacred texts were by ink rubbings from stone carvings of the original writings. Stone inscriptions of promulgated decrees occur from at least the third century BC. By the second century AD, stone was used to preserve permanent canonical versions of Buddhist, Taoist, and Confucian texts. Between the years 175 and 183, the complete texts of the seven main Confucian classics, amounting to 200,000 characters, were engraved on forty-six stone tablets. These do not survive, but a similar set made between 833 and 837 still exists near Sian, and is known as the Forest of



ABOVE (79) A traditional Chinese engraved woodblock; the print made from it and galleys (top). By permission of the British Museum, London.

Stone Tablets Also still surviving are 7000 stone tablets of Buddhist scriptures carved between the sixth and eleventh centuries

The Chinese were the world's leading experts at stone rubbing. The devout of all Chinese religions came with their ink and sheets of paper and made as many copies of the standardized sacred texts as they wanted. And indeed this was done constantly. But just as supply sometimes generates demand, so the availability of rubbings and scriptures seems to have acted as a tempting teaser: many people could now have the scriptures in their homes. But many was not most, for every person who had a rubbing there must have been a dozen who were encouraged to want their own. This new demand must have been an important stimulus leading to the development of actual printing.

The Chinese also used stencils and composite inked squeezes, the former being used particularly by the Buddhists. Paper had a pattern made in it consisting of rows of tiny dots. It was then pressed down on top of a blank sheet, ink was applied to the back, and a stenciled design in ink was the result. This was indeed very close to printing, for it enabled the cheap reproduction of a quantity of clear images – such as the Buddha sitting in meditation.

The composite inked squeezes were remarkable in that in a curious sort of way they anticipated photography. Using these sophisticated techniques, three-dimensional objects could be represented on flat paper with perspective, but with no problems of focus (i.e., no 'depth of field' problem existed). Rubbings would be taken of round bronze vessels whereby the more distant parts would be inked more lightly, and the nearer parts more heavily – giving the perspective effect to an eerie and uncanny degree. Inscriptions and decorations in three dimensions represented on paper could be carried around and kept in multiple copies in the home. This technique was known as 'whole shape rubbing' and it necessitated very careful study and preparation before being attempted. It ranks as one of the most highly skilled crafts ever practised anywhere. A good 'whole shape rubbing' looks so startlingly like a photograph in perfect focus that it seems nothing short of an inventor's miracle.

All of these techniques were still not sufficient for the needs of the Chinese. Foremost in pushing back the frontiers of printing technology were the Buddhists; they simply had to have many more copies of their sacred texts than hand-copiers and proto-

printing could produce. Therefore it was no accident that the earliest printed text in the world was a Buddhist charm scroll printed in China and preserved in the Pulguk sa Temple in Kyongju, south-east Korea, where it was discovered in 1966. It was printed some time between the years 704 and 751.

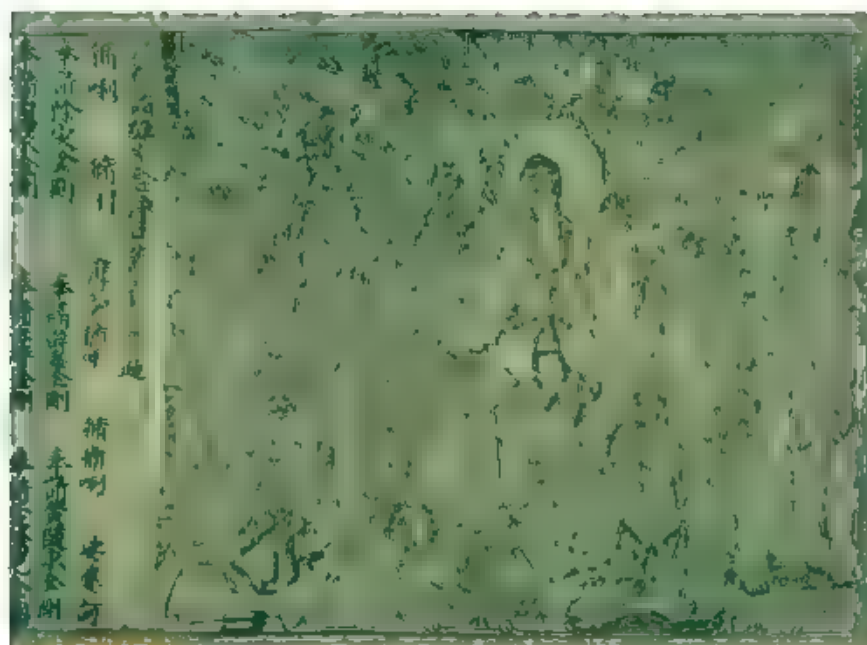
The print runs of the eighth century were quite literally fantastic – almost unimaginable, even by modern standards. The Buddhists took the new technology to Japan where the same Buddhist *sutra* of the Korean scroll was used as the source of a printed charm, and produced in a print run of *one million copies*. Many of these copies still survive today, even though they were printed in 764 AD.

The first complete printed book is thought to be the Buddhist *Diamond Sutra*, printed in the year 868 and discovered by Sir Aurel Stein in 1907. It is preserved in perfect condition in the British Museum. It consists of a scroll 17½ feet long and 10½ inches wide and contains the complete text of a Sanskrit work translated into Chinese, with a very elaborate and impressive frontispiece showing the Buddha in discourse with his disciple Subhuti, surrounded by attendants and divine beings. It bears a colophon at the end which says, 'On the fifteenth day of the fourth moon of the ninth year of Hsien t'ung [868 AD] Wang Chieh reverently made this for blessings to his parents, for universal distribution'.

There were also large print runs for ordinary books. For instance we know that between 847 and 851 several thousand copies were printed of a biography of the alchemist Liu Hung. Calendars were also very popular in printed form, and were even personalized. One calendar surviving from the year 882 is headed 'Family calendar of Fan Shang of Ch'engtu-fu in Hsi-ch'uan, province of Ch'ien-nan'. So many of these privately printed calendars were circulated that as early as 835 a regional official in the southern province of Szechuan suggested that they be banned – because they were being sold in marketplaces before the Board of Astronomers could approve and issue them, thus pre-empting and anticipating the government's important prerogative. (Chinese emperors looked upon it as a sacred and politically essential matter to revise and promulgate calendars; hundreds were produced during Chinese history.)

By the tenth century, *belles lettres* and philosophy were fully represented in print. Collections of the works of individual poets were being printed for them and circulated to friends. The scholar Ho Ning





867 The frontispiece of the world's oldest surviving book printed on paper, the *Diamond Sutra*, discovered at Tunhuang.

Author: Wang Zhiyuan  
Printer: Wang Zhiyuan  
Printer: Wang Zhiyuan

868 The frontispiece depicts the Buddha discussing with his disciples. Subtitle and surrounded by divine beings, known as the *Shoumen* (Heavenly Deities).

Printer: Wang Zhiyuan  
Printer: Wang Zhiyuan  
Printer: Wang Zhiyuan

(898–955) collected his poems and songs and had printed several hundred copies as gifts for his friends, in 913, the Taoist monk Tu Kuang Ping printed his own commentary upon the classic of Lao Tzu, the chief Taoist sage.

During the tenth century, the prime minister Feng Tao decided to print the eleven classics of Confucianism together with two supplementary books. Feng Tao managed to survive ten reigns of five different dynasties – a miracle of political survival in troubled time – which alone enabled him to complete his gigantic task. Finally, after twenty-two years, the Confucian classics were printed in 953. Filling 130 volumes, they were the world's first official printed publications, sold to the public by the Chinese National Academy.

By this time, printing had come of age. Vast quantities of certain works continued to be issued, ranging into many millions of copies. Of one Buddhist collection of the tenth century, over 400,000 copies still survive. So we can imagine what the initial print run must have been. Twenty thousand copies of a printed picture of a goddess on silk still survive from that century, and 140,000 of a picture of a pagoda from the same period. Three other works of that time survive in quantities of 84,000 copies each. Also during the tenth century, paged books were produced in the modern style, replacing the earlier printed scroll. This then was the establishment of a woodblock

printing industry which in the quantities produced rivalled the most modern efforts of our own times.

The blocks used by the Chinese for their printing tended to be made of fruit woods. Coniferous woods were found unsuitable, because they were impregnated with resin which affected the evenness of the ink coating. For cutting delicate lines in illustrations, a favourite material was the extremely hard wood of the Chinese honey locust tree. For regular text, the soft and easily worked boxwood was often used. But the best all-round wood for block printing was pear. This has a smooth and even texture with a medium hardness, and can be carved in any direction with no grain problems. The slightly harder wood of the Japanese date tree was probably the second most commonly used. Naturally, there had to be no knots or spots in the wood, and after cutting the blocks, it was customary to soak them in water for a month. But if there was insufficient time, they were boiled then left to dry in a shaded place and planed on both sides, for it was common to print pages simultaneously on each side of a block. Vegetable oil would be spread over the planed surface, which would be polished with the stems of polishing grass (*Achnanthes*).

Printing blocks were normally kept for long periods of time – sometimes centuries – in the same form. Large print runs of books tended not to be the rule: a few tens of copies would be run off, then the blocks would be stored away until a few dozen

R C I T (B) This drawing is from a book printed

1343, albeit surprisingly considering his

view of the reason being to illustrate

the rotating wheel of the *Treasure* on

wheel & speed rotation

of the classical story

ons of movable type which

were invented circa 1040 by

Bi Sheng. All the characters

were either carved into

wood, iron or of into

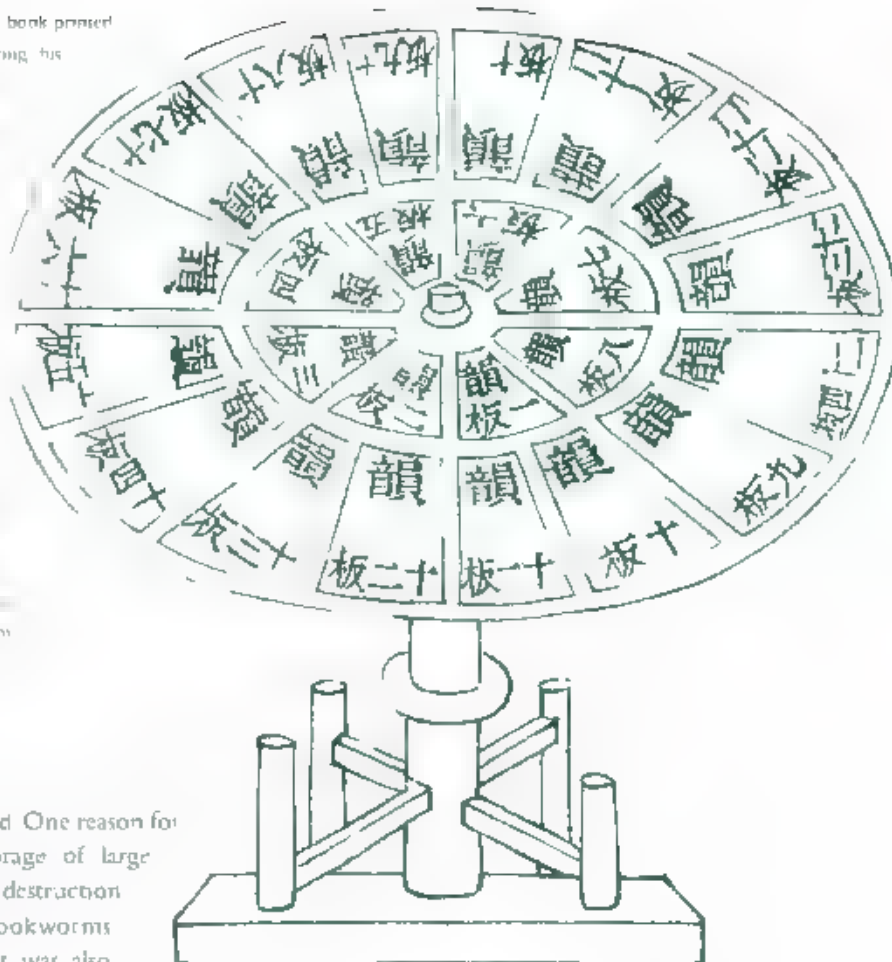
according to their rhyming

spoken sounds, in twenty-four

By spinning the composition wheel

in attuning to this easy system

for speedy typesetting



more copies were in demand. One reason for cutting down on the storage of large quantities of copies was the destruction regularly wrought by bookworms in some areas of China. It was also economically advantageous to wait for orders before buying the paper.

Korea was the first country to which printing spread from China, around the year 700. Many old printing blocks survive at the Haein-sa Temple high on Mount Kaya in southern Korea; 81,258 blocks of magnolia carved on both sides are preserved intact today, which were used to print a Buddhist classic between the years 1237 and 1251.

Such a large number of printing blocks would not have been exceptions in China. Chinese printing was on a large enough scale to cope with the country and its population, and one individual printer in Changsu in the seventeenth century named Mao Chin is known to have printed 600 titles on a variety of subjects. For the Thirteen Confucian Classics he used 1,846 blocks for the Seventeen Standard Histories he used 72,293 blocks, and for another collection he used 16,637 blocks. Even during the early stages of his career, this single private printer employed twenty block cutters and had a store of over 100,000 printing blocks. But these quantities are small compared to

those of the imperial printers who produced several editions of the great imperial encyclopedias – over five thousand printed volumes each. Many of these sets still survive today.

The Chinese were also the inventors of multi-colour printing. Paper money produced in the year 1107 was printed in three colours as a precaution against counterfeiting, though in this case it is possible that the two additional colours may have been stamped onto the paper. The money in question had legends in black, a circle design in vermilion, and a 'blue face' in indigo. Two-colour printing of texts seems to have begun during the next century, and an edition of the *Diamond Sutra* of 1340 survives, which uses black for the text and red for prayers and pictures. It became common for commentaries to appear in red beside black texts. The earliest surviving four-colour printing dates from the early twelfth century and is in black, grey, green and red on a large single sheet discovered in 1973 in the cavity of an old pillar. It shows a



BELOW (83) It is hard to believe that this magnificent example of multi-colour colour printing dates from the seventeenth century, but it does. A bird is seen on a snow-covered glossopteris branch in early spring, misty (and northern Chinese) location, where would be cold at this time). Multi-colour printing was invented in China no later than the eleventh century, as three-coloured paper money was printed (a precaution against counterfeiters) in a mass print-run in 107 and still survives, as does a two-coloured book of 1340. This print comes from the famous multi-coloured book in several volumes, *Ten Bamboo Studio*, of Hu Cheng-yen from the 1663 edition. Hu named his art and printing studio at Nanjing 'Ten Bamboo' after the trees outside its window. The prints in this book heighten their effects by subtle variations in ink and pressure on the



blocks during the act of printing, as may be seen dramatically in the gradations of pink in the blossoms, themselves made possible only because inks of a watery rather than oily nature were used. Although the pages of this book are flat, the decorated letter paper produced at the same studio in 1644 by Hu and his colleague Tsao Sung-hsueh gave yet another dimension to the colour printing by combining it with special hand-c rubbing that enhanced the colour pressure variations even further, creating a subtle varying depth in three dimensions. The Ten Bamboo Studio team achieved quite spectacular printing effects that they have still not been rivaled even today, as the subtle skills of variable hand-pressure on wooden printing blocks are now a completely lost art (Chinese Department, British Library).

mixture of pine resin, wax, and paper ashes. When he wished to print, he took an iron frame and set it on the iron plate. In this he placed the types, set close together. When the frame was full, the whole made one solid block of type.

If one were to print only two or three copies, this method would be neither simple nor easy. But for printing hundreds of thousands of copies, it was marvellously quick. For each character there were several types, and for certain common characters there were twenty or more types each, in order to be prepared for the repetition of characters on the same page. When the characters were not in use, he had them arranged with paper labels, one label for words of each rhyme-group, and kept them in wooden cases. If any rare character appeared that had not been prepared in advance, it was cut as needed and baked with a fire of straw. In a moment it was finished.

When Pi Sheng died, his font of type passed into the possession of my nephews, and up to this time it has been kept as a precious possession.

Earthenware types of the nineteenth century survive in China, but it became more common to use wood, enamel ware, or metal in later times. The use of wooden type was perfected two-and-a-half centuries after Pi Sheng by Wang Chen, which he did, intending to use it to print his classic, the *Treatise on Agriculture*, in 1313. The wooden type was made in the years 1297 and 1298, and Wang Chen has left an account of the process.

More noteworthy than perfecting wooden type were Wang Chen's storage and handling arrangements. The type was stored in revolving cages 7 feet in diameter, supported by central legs 3 feet high. Ingenious sorting and classifying schemes were used to enable workers to find the necessary characters quickly. In the end, the *Treatise on Agriculture* was printed with bronze characters. But Wang Chen's 60,000 wooden type characters were used to print the local book *Gazetteer of Ching-te County*. One hundred copies of it were printed in less than a month in the year 1298.

Movable type continued to be used sporadically throughout Chinese history. It was revived under the Mongols when a councillor of Kubla Khan decided





of Shen Kuo to print books of philosophy. A nineteenth-century teacher named Chen Chongshu, born in 1784, spent thirty years making a font of earthenware type, using everyone in his family to help him. By 1844 he had finished over 30,000 sets of five sizes which he used

*earthenware Edition with Earthenware Type*. He is the first and perhaps the only author printed in this way.

Movable, wooden type dates from about the year 1000. It survives from Eastern Turkestan, a then-known as Turfan, where it was introduced by the Chinese after the Mongol conquest. Movable type

for the Chinese language printing is thought to have spread to Europe through Turfan and the through Persia, which the Mongols also conquered. Paper money was printed following the Chinese

method in Persia in 1294. It was even called with Chinese name, *chiao*, which means red. Persia's language. Fifty printed pieces of paper money are preserved according to the Chinese method.

printed sometime between

The Mongol armies pressed farther westwards over mountains, to India in 1240, to and in 1242, and Hungary in 1241.

fourteenth century. A hard evidence exists for the transmission from China, the earliest evidence is strong to support it. In 145, John Henry, the Mongol invasion, not only the

2000. *The H.*

But the Chinese do affirm that the first beginning [of printing] was in their country, and the inventor was a man whom they reverence for a saint, whereby it is evident that many years after that they had the use thereof, it was brought into Almaine by the way of Russia and Moscouia [Russia and Moscow], from whence as it is certain, they may come by land, and that some merchants that came from Arabia Felix, might bring some books, from whence this John Gutemberg [Johannes Gutenberg], whom the histories dooth make author [inventor], had his first foundation [got the idea]

## PLAYING CARDS

Paper was invented in China, and it is therefore not surprising that the Chinese were the first to invent paper playing cards. By the ninth century at the latest, these were in use. The first known book on card

play was written by a woman in the ninth century, but it is lost. The scholar Chao Yung Hsu (1907-72) recorded that the use of paper playing card

if book format from paper rolls to paper sheets and pages. The playing cards were printed by wooden blocks, and many specimens survive, ten colored by hand.

were drawn by hand. The known novel *The Hsiao Mao*. The shape of the cards was about 2 inches by 1 inch.

機印



造價

Citation

invention in 'Asia' (C)



than those of today though doctors say they were more difficult to shuffle.

[illegible]

Playing-cards spread to the West from China either through the Arabs or through the travel such as Marco Polo who circulated during the Mongol Dynasty. The earliest European travel account is by Ibn Battuta in the thirteenth century where Zanzibar mentioned that Venice was the first European city to have playing-cards from China. The earliest printed card game book was published in Germany and Spain by the year 1377. By 1379

38.  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

Even Johann Gutenberg, who is credited with the invention of European printing, by using the movable type system, had to employ the hand of a skilled craftsman to set the type and to operate the printing press. He actually developed the mechanical means for composition and the financial means to develop and operate the press. He was forced to close his Mainz workshop in 1469, which his artists had prepared to print the famous Bible were used to print the backs of playing cards. This extraordinary fact certainly highlights the close connection that has always existed between playing-cards and book printing.

## PAPER MONEY

The government had previously issued paper money, but it had been used only for the purchase of goods and services. The government had also issued paper money for the purchase of goods and services, but it had been used only for the purchase of goods and services. A merchant could deposit his cash in the capital, receiving a paper certificate, which he could then exchange for cash in the provinces. This private

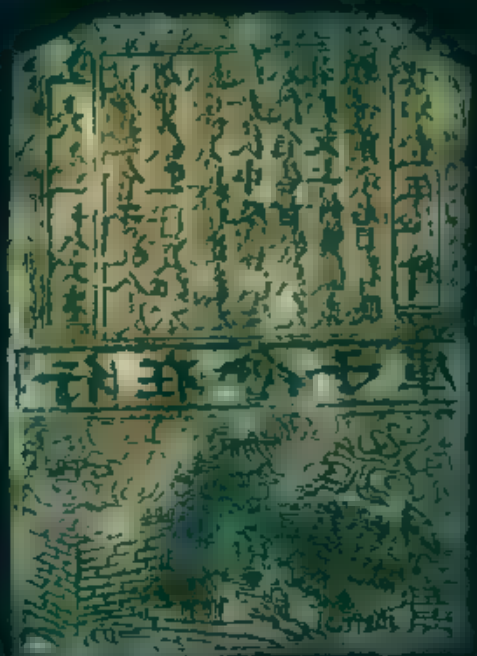
mercantile enterprise was quickly taken over by the government in 842. The technique was then used for the forwarding of local taxes and revenues to the capital. Paper "exchange certificates" were also in use. These were issued by government officials in their capital and were redeemable elsewhere in the kingdom, such as salt and rice.

Real paper money used as a medium of exchange had backed by deposited cash, apparently some time being early in the tenth century in the southern province of Szechuan, as a private enterprise. Early in the eleventh century the government authorized all private business or "banks" to issue notes of exchange. But in 1023 the government nationalized private enterprise and set up its own official agency for issue: bank notes of various denominations which were backed by cash deposits. We can thus probably claim the world's first governmental currency issued by a bank to 1023.

The currency issued by this bank had proved successful to the extent that it was good for only three years

and gave the date. Such a time limit was to be a regular feature of Chinese paper money up until the nineteenth century. By 1072 notes were being printed with multiple blocks in no less than six colors.

The issuing of paper money by the government took on enormous proportions. By 1126, twenty million string knots being equal to one thousand pieces of "cash" had been officially issued. The amount of this paper money was backed by heavy deposits, and a horrifying deflation occurred. Inflation may be looked upon as a phenomenon which accompanies paper money, arising from its not being backed by anything more substantial. Other instances of "inflation" in history should probably be differently described. Accelerating price increases before the use of paper money such as occurred so grandulously under the Roman Empire, was often caused by debasement of the coinage. The Roman Empire is infamous for having produced final inflationary coinage out of increasingly cheap and worthless metal.





There was also the deleterious process known as 'clipping' whereby not only gold and silver coins but sometimes governments themselves issued and circulated coins with pieces cut off them. The real value of such clipped coins was of course diminished, though the fiction was supposed to be maintained that they were worth the same as ever. But debasements and clipping of coinage should surely be differentiated from true inflation, which resulted from the issuance of paper money and was thus 'invented' in China along with the paper money that gave rise to it.

Another problem which soon arose in China was counterfeiting. If precious metal coins are in circulation which are intrinsically worth their true value the only kind of counterfeiting possible is with false, disguised metals. This has often been done, and was a major impetus to alchemy, and the manufacture of spurious gold and silver. But paper money invited counterfeiting by its very nature, since the essence of it is not its inherent substance but the authority on which it was issued. Paper money is a symbol. To counterfeit is therefore not to fabricate a substance but to impersonate the authority issuing it. Since anyone can print on pieces of paper, the authority must make the processes of manufacture of its paper money so intricate that they cannot be exactly reproduced. Complex manufacturing secrets were thus adopted quite early, and included multiple colourings, immensely complex designs, and a mixture of fibres in the paper. The basic material for the paper of paper money was the bark of mulberry trees, and silk was sometimes incorporated. One could hand in soiled or worn-out notes for new ones but had to pay the small cost of the printing of the replacement.

A detailed case of a counterfeiter of 1183 survives which tells us that he printed 2600 false notes during the six-month period before he was caught. He was a master block-cutter, and he cut a block of pearwood in direct imitation of the design on a real note. It was a three-colour process, involving sequential serial numbers in blue and seals in red. It took the counterfeiter only ten days to cut the block. But counterfeiters did not have an easy time of it when they were caught, for their crime carried the death penalty.

When the Mongols came to power in China, they issued a quaint form of paper money called 'silk notes'. The deposits behind this currency were not precious metals but bundles of silk yarn. All older money had to be cashed in and exchanged for silk

notes and the Mongols spread this unified currency all over the Empire and even beyond it. By 1294, Chinese silk notes were being used as money as far afield as Persia. In 1965, two specimens of silk notes were found by archaeologists.

When Marco Polo visited China, he was so impressed by paper money that he wrote a whole chapter about it, describing everything about its manufacture and circulation. He described the manner in which it was issued:

All these pieces of paper are issued with as much solemnity and authority as if they were of pure gold or silver, and on every piece a variety of officials, whose duty it is, have to write their names, and to put their seals. And when all is duly prepared, the chief officer deputed by the Khan smears the Seal entrusted to him with vermilion, and impresses it on the paper, so that the form of the Seal remains printed upon it in red, the Money is then authentic. Anyone forging it would be punished with death.

Paper money under the later Ming Dynasty was not so effective. The Ming issued in 1375 a new note called the 'Precious Note of Great Ming'. It was issued in one denomination only throughout the two hundred years in which it was the legal tender. This was naturally very inconvenient for all commercial purposes, although copper coins were permitted to circulate, and these must have provided the small change necessary in everyday life. Through inflation, the Precious Note gradually lost its value and was replaced by silver. In the middle of the seventeenth century, the Ming tried to reinstate paper money after a lapse of about two centuries, but it was badly implemented, resulting in great inflation, and failed. Paper money on a national scale and a regular basis died out until European influence brought it back in modern times.

When the older methods of paper money issuance became known in the West, they had a profound influence on Western banking. The old Hamburg Bank and the Swedish banking system were set up on Chinese lines. Thus, some of the fundamental banking procedures of the Western world came from China directly. The first Western paper money was issued in Sweden in 1661. America followed in 1690, France in 1720, England in 1797, and Germany not until 1806.

## 'PERMANENT' LAMPS

The Chinese developed the simple oil-and-wick lamp to its furthest possibilities. First of all, they regularly used wicks that do not burn, as described in the book *Memoirs on Neglected Matters*, written about 300 AD:

In the second year of Kang Chao of Yen, the sea-people brought oil in ships, having used very large kettles for extracting it, and presented it to him. Sitting in the Cloud-Piercing Pavilion he enjoyed the brilliant light of the lamps in which the dragon blubber was burnt. The light was so brilliant that it could be seen a hundred li away [somewhat more than 30 miles], and its smoke was coloured red and purple. The country people, seeing it, said, 'What a prosperous light!', and worshipped it from afar. It was burnt with wicks of asbestos.

This was in either 598 BC or 308 BC. We cannot be sure of the date, for there were two kings of Yen named Chao. Needham comments on this passage: 'Whatever the date to which this really refers, it must surely imply that some kind of primitive sea-going or whaling was going on in Han or pre-Han times, and that the oil or blubber was consumed in the courts of coastal princes with unburning wicks.' Needham has gathered much material on the history of asbestos in ancient China, and mentions that the famous general Liang Chi, who died in 159 AD, had an incombustible gown of asbestos which he used to throw on the fire at parties. The asbestos wick for lamps essentially meant a permanent wick which did not need to be replaced and would burn as long as the oil was replenished.

However, asbestos wicks were by no means the limit of ancient Chinese ingenuity with regard to the economical use of lamps. The Chinese were determined to squeeze fire out of stone and get something for nothing. Having developed the inexhaustible wick, they turned their attention to the nearest thing to inexhaustible oil. Their lamps were simple dishes or cruets full of oil with wicks sticking out of them. The Chinese noticed that the heat of the burning wicks made much of the oil evaporate before it could be productively burnt. In order to counteract this, they devised a way to cool

the lamps and thus prevent the evaporation, as we are told by the author Lu Yu, in his book *Notes from the Hall of Learned Old Age* published about 1190 AD:

In the collected works of Sung Wen An Kung there is a poem on 'economic lamps'. One can find these things in Han-chia, they are actually made of two layers. At one side there is a small hole into which you put cold water, changing it every evening. The flame of an ordinary lamp as it burns quickly dries up the oil, but these lamps are different for they save half the oil. When Shao Chi was the Prefect at Han-chia, he sent several of them to scholars and high officials at court. According to Wen An one can also use dew. Han-chia has been producing these for more than three hundred years.

So, underneath the oil there was a reservoir, into which cold water was poured, resulting in a saving of half the oil used. Since in 1190 the lamps had been manufactured for more than three centuries, the production on a mass scale must have begun no later than the beginning of the tenth century AD and, as Needham says, perhaps early in the ninth century AD. He adds: 'It was an interesting anticipation of the water-jacketing of the chemical condenser in distillation, and of the steam and water circulatory systems of all modern technology.'

The 'economic lamps' were generally made of glazed earthenware, and several good specimens are preserved in the Chungking Museum in China. Since simple wick lamps have remained in use well into the latter half of this century in China, perhaps a reintroduction of the 'economic' water-cooled version would be useful in parts of rural China today.

## THE SPINNING-WHEEL

The homely device of the spinning-wheel, which evokes images of European cottage life and Indian rural productivity alike, had its origin in China. The earliest known European reference to a spinning-wheel is an indirect one in the statutes of a guild at Speyer, Germany, in about 1280. Needham believes spinning-wheels and other machines to do with



1. The first part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for a systematic approach to bookkeeping, ensuring that every entry is properly documented and categorized. This section also touches upon the role of the accountant in overseeing the financial health of the business and providing regular reports to management.

2. The second part of the text focuses on the various methods used to collect and analyze financial data. It describes different types of accounts, such as assets, liabilities, and equity, and explains how they are used to track the flow of money in and out of the organization. The text also mentions the use of specialized software and tools to streamline the bookkeeping process and reduce the risk of errors.

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4. The fourth part of the text focuses on the various methods used to collect and analyze financial data. It describes different types of accounts, such as assets, liabilities, and equity, and explains how they are used to track the flow of money in and out of the organization. The text also mentions the use of specialized software and tools to streamline the bookkeeping process and reduce the risk of errors.

5. The fifth part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for a systematic approach to bookkeeping, ensuring that every entry is properly documented and categorized. This section also touches upon the role of the accountant in overseeing the financial health of the business and providing regular reports to management.

6. The sixth part of the text focuses on the various methods used to collect and analyze financial data. It describes different types of accounts, such as assets, liabilities, and equity, and explains how they are used to track the flow of money in and out of the organization. The text also mentions the use of specialized software and tools to streamline the bookkeeping process and reduce the risk of errors.

7. The seventh part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for a systematic approach to bookkeeping, ensuring that every entry is properly documented and categorized. This section also touches upon the role of the accountant in overseeing the financial health of the business and providing regular reports to management.

8. The eighth part of the text focuses on the various methods used to collect and analyze financial data. It describes different types of accounts, such as assets, liabilities, and equity, and explains how they are used to track the flow of money in and out of the organization. The text also mentions the use of specialized software and tools to streamline the bookkeeping process and reduce the risk of errors.

9. The ninth part of the text discusses the importance of maintaining accurate records of all transactions, including sales, purchases, and expenses. It emphasizes the need for a systematic approach to bookkeeping, ensuring that every entry is properly documented and categorized. This section also touches upon the role of the accountant in overseeing the financial health of the business and providing regular reports to management.

10. The tenth part of the text focuses on the various methods used to collect and analyze financial data. It describes different types of accounts, such as assets, liabilities, and equity, and explains how they are used to track the flow of money in and out of the organization. The text also mentions the use of specialized software and tools to streamline the bookkeeping process and reduce the risk of errors.





腦者髓之海諸髓皆屬於腦  
上至腦下至尾骶腎主之也

兩乳中間名曰膻中  
為氣聚之海能分布  
陰陽不可損傷也

之上層曰膈大層曰  
過濁氣使不薰蒸於上

關門在

髓海

至陰之在  
直通尾骶

飛門

戶門

頭骨

食氣

吸門

肺管

肺

肺

肺

絡

心

胃脘

膈

膈

脾

胃

幽門

賁門

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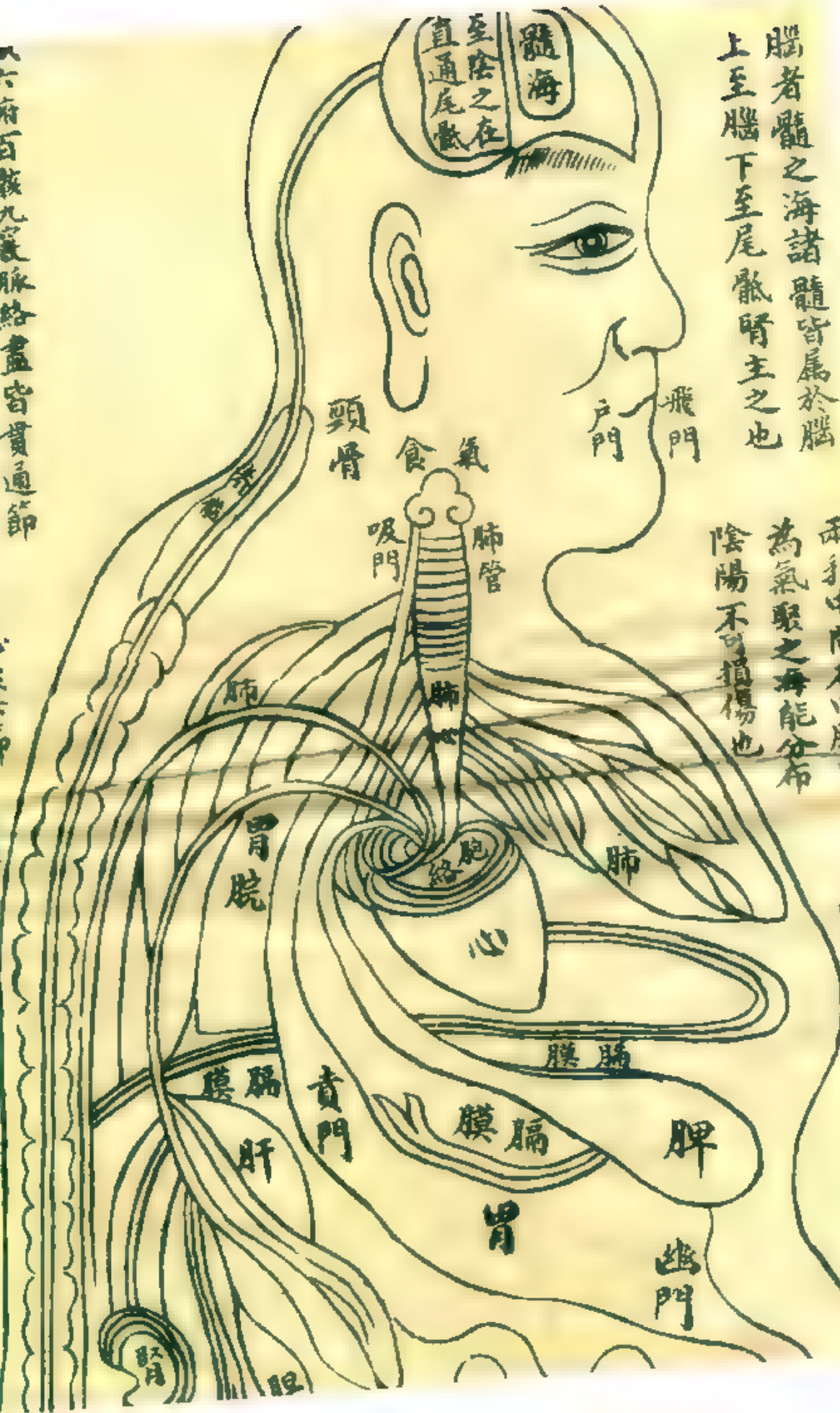
胆

六腑百骸九竅脈絡盡皆貫通節  
無有間斷今畫其大略使觀者便覽

心集六節

腎集七節

節之旁中有小心集小心





**ABOVE: 1697** The frontispiece to the manuscript of Andreas Cleyer book of 1687 about Chinese pulse take. *Spionariae medicinar Sinum*. The Chinese doctor is taking the patient's pulse, while his boy assistant stands ready with acupuncture needles, rings and various powdered ointment—medicines used to burn or stimulate acupuncture points. A portable stove stands in the foreground ready for use (possibly sterilize the acupuncture needles; steam sterilization was traditional in China for several centuries). Cleyer was editor, not author of this book, which included Latin translations of old Chinese medical texts concerning the circulation of the blood (Shao-yin ch'ueh-t'ien, part of K'ung-tzu's *Jen-ch'ien*).



length, and made measurements of the total distance travelled by the blood in one circuit. This was estimated by these measurements to be 162 feet.

Once every 24 hours the blood circulation and the first circulation 'met' again in the wrist, having completed fifty blood circuits, so that the circulations coincided. The Chinese thus computed that the blood flowed 8100 feet per day. During this time, 13,500 breaths were supposed to take place, this meant that the blood flowed 6 inches for every breath. By making all these calculations, the Chinese imagined themselves to be pinning down the phenomenon quite comfortably.

The heart was clearly conceived of as pumping the blood. Indeed, Chinese doctors used in their classrooms an extraordinary system of bellows and bamboo tubes to pump liquid in demonstrations for their pupils, showing how the heart and blood circulation worked.

In the calculations of the flow of the blood in the body, each circulation was estimated as taking 28.8 minutes. We know through medical research that this is too slow by sixtyfold, the true time being only 30 seconds. William Harvey had not come to any conclusion about this, speculating that the time taken might be 'half an hour, an hour, or even a day'.

The Dutch East India physician, Willem ten Rhijne, stated in his book of 1685 *Monita Senenica de Acupunctura*, that the circulation of the blood was one of the basic tenets of the whole of Chinese medicine. He wrote 'The Chinese physicians perhaps devoted more effort over many centuries to learning and teaching with very great care the circulation of the blood than have European physicians individually or as a group. They base the foundation of their entire medicine upon the rules of this circulation, as if they were oracles of Apollo at Delphi'.

**LEFT: 1617** The body as a mountain, a growing, a life-giving story by Ching Po-Tsun in the version of 1335 as it appeared in Chen Chit-Huei's *Illustrations for the Yung Fung-tai*, in the *Metaphysical Encyclopedia of the Great Ming*. In this body-mountain, the rivers represent the life-force energies, and blood flowing around the body. At the top is K'uei-lan mountain peak representing the head and containing the brain and mind. Tower mechanism of the brain. The large pagoda at the lower central portion of the body-mountain is the Yellow Court, where all rivers of blood and the circulation meet.







92) A pair of tles from the Han Dyna... of the divisions of the day and night  
Left: Zu, guard an of midnight (front) ...  
... with the hours of the day and night ... Museums of Shaanxi, Xi'an, China

Those who have a disease of the liver are animated and quick-witted in the early morning. Their spirits are heightened in the evening and at midnight they are calm and quiet. .. Those who suffer from a sick heart are animated and quick-witted at noon, around midnight their spirits are heightened, and in the early morning they are peaceful and quiet. .. Those who suffer from a disease of the spleen are animated and quick-witted around sunset, their spirits are heightened around sunrise and towards

evening they become quiet and calm. Those who suffer from a disease of the lungs are animated and quick-witted during evening, their spirits are heightened at noon and they are calm and peaceful at midnight. .. Those who suffer from a disease of the kidneys are quick-witted and active at midnight, and their spirits are heightened during the entire days of the last months of Spring, Summer, Autumn, and Winter, and they become calm and quiet toward sunset.



Modern medical practice has shown that there are indeed quite drastic variations in the severity of diseases and symptoms at different times of the day. For instance, it has been found that between 9 p.m. and midnight, the disabling symptoms of Parkinson's disease frequently disappear altogether. The worst paroxysms of asthma generally occur during the night when the secretion of the hormones from the cortexes of the adrenal glands drops to its minimum. Sensitivity to histamines is greatest at 11 p.m., when the body levels of certain cortico-steroid hormones are at their lowest. The affliction of cholecystitis (inflammation of the gall bladder) is always worst in the early hours of the morning. Fevers and body temperatures increase toward evening, and our sensitivity to pain varies considerably at different times of day and night. These are all phenomena resulting from the body's internal circadian rhythms.

Acupuncture, which is thought to go back to 1500 BC in China, was practised with circadian rhythms in mind. Hence the name of one medieval acupuncture manual, *Noon and Midnight Manual*. Another work on acupuncture was entitled *Mnemonic Rhyme to Aid in the Selection of Acupuncture Points According to the Diurnal Cycle, the Day of the Month, and the Season of the Year*. The diurnal cycle refers to the daily rhythms. This work is said to have been written about 419 AD, though it may date from 930 AD.

There were many other cycles besides the circadian rhythms noted by the Chinese doctors. Some were sensible, others nonsensical. Today through modern medicine, we know that duodenal ulcers have cycles of 139 days, that Hodgkin's disease has a cycle of 21 days, and so on. The Chinese practitioners seem to have noticed some of these things, but most of their cyclic lore was superstitious numerology. What was soundest of all was the brilliant early insight into the existence of those circadian rhythms which even today we cannot yet fully explain or understand.

## THE SCIENCE OF ENDOCRINOLOGY

The Chinese anticipated modern biochemistry to such an extent that by the second century BC they were isolating sex and pituitary hormones from human urine and using them for medicinal purposes. The crystals which they obtained were traditionally called 'autumn mineral' being likened to the hoar-frost of the autumn. The Prince of Huai-Nan seems to have coined this term some time before 125 BC, to express its white colour and its solidity'. This prince was one of the foremost proto-scientists of early China, who had a school of Taoist adepts and philosophers where experiments on many physical processes were carried out.

Opposition to experimentation and study by the Taoists was voiced in 25 BC by Ku Yung, a high official whose speech against all magicians and alchemists is preserved in the official history of the time. He makes the following attack:

The Taoists say that by fusing cinnabar they can transform it and make yellow gold, and that from dark and muddy [that is, concentrated] urine they can make a hard white ice-like [crystalline] substance.



LEFT: 93. A painting from a *Leaves of the Pharmacopoeia* (Kao-shih) illustrating the process of sublimation of cinnabar (mercurous chloride). The figure on the left is brushing the crystals from the sublimation. This same process was used for collection of pure crystals of human sex and pituitary hormones from human urine by the second century AD. From a collection of human urine 2 to 3 ounces of hormone crystals could be produced by this method. (Biblioteca Nazionale Centrale, Vittorio Emanuele II, Rome.)

The great poet Pai Chu-I (772-846 AD) wrote a poem entitled "Thinking of Old Friends" in which he mentioned that his friend Yuan Chen (another poet (779-831), had prepared the "autumn mineral" drug / yet while still young encountered sudden death.

Several centuries later, explicit recipes for the preparation of 'autumn mineral' begin to appear in print. To our knowledge the first such recipe to be published was in the book *Valuable Tried and Tested Prescriptions*, written by Chang Sheng-Tao and published in 1075. Between 1125 and 1833, at least ten different methods of obtaining sex and pituitary hormones from urine were published in thirty-nine different books. Production of these hormones took place on an enormous scale using hundreds of gallons of human urine for each batch and manufacturing countless thousands of doses of the drugs for medicinal use.

It was only in 1927 that S. Ascheim and B. Zondek published the discovery in Europe that the urine of pregnant women was rich in steroid sex hormones. Subsequently, the discovery was made that urine contains androgens and oestrogens (male and female sex hormones), and pituitary hormones known as gonadotrophins, which stimulate the sex glands (gonads) in profusion. Fertile drugs given to women today to make them produce more eggs are extracted from the urine of menopausal nuns in Italy. The derivation of sex hormones from human urine is today a standard practice, and modern medicines could not do without human urine as their source.

It is therefore remarkable that the Chinese anticipated this practice by 2200 years. The oldest published recipe for these hormones, dating from 1125, says:

Collect ten *tan* [over 150 gallons] of male urine and set up a large evaporating pan in an empty room. Fix on top of it a deep earthenware still, luting the edges together with paper-pulp and lime so that when it has dried no steam can escape. Fill the evaporating basin 70 to 80 per cent full with urine, and heat strongly from below, setting a man to watch it. If it froths over, add small amounts of cold urine. It must not be allowed to overflow. The dry residue is *pen ching pin*. Put some of this, finely powdered, into a good earthenware jar and proceed according to the method of sealing and subliming by placing the whole in a stove and heating with charcoal. About two or three ounces [of sublimate] will be obtained. Grind this to a powder, and mix

with date-flesh to make pills the size of a mung bean. For each dose take five to seven pills with warm wine or soup before breakfast.

The process commences with simple evaporation, of the kind practised on a huge scale in the industry for producing salt by the evaporation of brine (see the account of deep drilling for natural gas on page 51). This left the dried solids of the urine which had to be further processed to rid them of the urea salts and so on. The Chinese then turned to the process of sublimation, which was familiar from alchemy. The simplest form of sublimation is just to invert a pot over a glowing fire. Substances are thrown onto the red hot charcoal or hot ashes and sublimed upwards where they form a coating of material on the underside of the lid. An improvement of this process is to set a removable lid into the pot, which can be taken out and the powder coating brushed off with feathers. But in the urine process just described, the sublimation is a more sophisticated type. It is noteworthy that from 50 gallons of urine only two or three ounces of the precious sublimate of hormone crystals were yielded.

The Chinese stumbled upon a discovery which Europeans made only in this century, namely that steroid hormones are stable at temperatures below their melting-points, and can be successfully sublimed at temperatures varying between 30° and 210°C. There is no decomposition of steroids up to 260° and many of them will sublime successfully at temperatures up to 300°C. Not all the Chinese methods involved sublimation, but of those that did, the process would have taken place at temperatures carefully controlled between 120° and 300°C – the very temperatures modern scientists now know to be appropriate. By this means, the hormone substances were separated from a large amount of extraneous matter and rendered relatively pure. They would still have contained amounts of some other substances, including cyanuric acid, but this has no known effects and would simply have been neutral in the preparation. Small amounts of other matter, such as iodolskato-mercaptans, volatile fatty acids and non-steroid phenols would have mattered little, as they are all non-toxic. The hormone crystals obtained by the Chinese would not have been pure according to our modern standards, but they were without doubt highly effective concentrated hormone substances with pronounced biological effects on patients.



natural soap, and also the proteins of the soap beans, had remarkable success in precipitating the hormones out of the urine into sediment. Adolf Windaus only discovered in 1909 that such substances can be precipitated by natural soaps (in his case one called digitonin). Once again, the Chinese anticipated a modern scientific discovery by many centuries. (The earliest published method using natural soaps in this way dates from 1110, though the technique may be centuries older than that.)

There were other methods of extracting the hormones from urine which involved neither sublimation nor forced evaporation by fires. These used natural evaporation by the heat of the sun, after the addition of distilled water (sometimes called autumn dew water).

A great deal of attention was paid to whether the urine came from males or females, and it was mixed in varying quantities according to which kind of hormone one wanted, so that the effect was inevitably to produce 'autumn mineral' predominantly of androgens (male hormones) in some cases and predominantly of oestrogens (female hormones) in others.

In addition to the sex hormones which were isolated, there were pituitary hormones. The pituitary gland is a tiny gland in the brain which is the master gland for the entire body. It secretes a wide variety of hormones which activate or de-activate the body's other glands. Although it is only about the size of a pea, the pituitary is the most important gland we have. Its anterior lobe secretes hormones called gonadotrophins, which stimulate the gonads (sex glands). These occur in the urine, and some of the Chinese processes would have isolated gonadotrophins as well as steroids produced by the sex glands themselves. The gonadotrophins themselves actually stimulate the production of steroids by the gonads, so that by giving patients 'autumn mineral' the ancient Chinese doctors were giving double treatment — the steroids themselves and also stimulants for the patient to produce more of his own steroids.

The Chinese were predisposed by their manner of thought and a long tradition to view the body as producing powerful biologically active materials. There was an entire branch of Chinese alchemy which was devoted exclusively to this. On the one hand there was the *nei tan* school of alchemy which attempted to produce elixirs of immortality from minerals such as cinnabar, by straightforward chemical means in the laboratory. But there was on the other hand the more

esoteric school of alchemy, the very existence of which was masked by veiled references and unknown to all but the initiated — the *wai tan* school. It pursued the achievement of immortality by transformations of bodily substances through various physiological techniques. (A simple example was the practice of refusing to spit, since saliva was considered to be a precious bodily fluid which must not be wasted.)

Prominent in *wai tan* alchemy were various peculiar sexual practices. Asceticism was never popular in China, and Taoist monks were so far from being celibate that they pursued extravagant careers of sexual intercourse as part of their devotions. Taoist nuns were anything but virgins. The *yang* and *yin* ideas in China led to a prominence of sexual activity in Chinese culture which contemporary Westerners would have found incomprehensible, having been brought up in religious traditions where sex was generally viewed as sinful.

It is important to realize the essential and central role of sex in Chinese life and culture, in order to view in proper perspective the Chinese achievement in isolating and using the sex hormones and gonad-stimulating pituitary hormones as medicines. Far from shunning sexual matters, the Chinese thought about sex and practised sexual activity far more than Westerners. It is doubtful whether, in the West, it would have been considered proper or even admissible to pursue the isolation of such substances from urine, even had the idea occurred to anyone. The mass-production of sex hormones in the West would at most points in history simply have been unacceptable.

How did the Chinese use these hormones? They were used to treat a wide variety of ailments relating to the sex organs. Among those conditions treated were hypogonadism, impotence, sex reversals (where males spontaneously turned into females or vice versa — a phenomenon well known in ancient China), hermaphroditism, spermatorrhea, dysmenorrhea, leucorrhea, sexual debility, and even apparently stimulating the growth of the beard (since the Chinese knew that men grew beards as a result of having testicles and ceased to do so when castrated). As for the matter of swallowing oestrogens, it is known that they tend to be rendered inactive by the liver, but the Chinese seem to have indulged in such large doses that it is thought that oral consumption of them would have been effective. Perhaps the pituitary hormones were more important than the oestrogens, since they would have stimulated the patient's own oestrogens. There are



still a number of unanswered questions about the ancient Chinese hormones. For instance, no one has yet tried to reproduce the processes of extraction described in the Chinese texts, to see just what is actually produced. It is clearly a field for experimentation and investigation in the future. But there is no doubt whatsoever that the Chinese actually founded the science of endocrinology, and are entitled to the credit for that great achievement.

## DEFICIENCY DISEASES

by Dr. NIKOLAI

By the end of the nineteenth century in the West, medical men had come to realize that many diseases, such as beriberi, scurvy and rickets, were deficiency diseases. That is, they were caused by the lack of certain items in the diet. In this century, we have identified the missing dietary constituents as vitamins.

But the Chinese were aware of deficiency diseases centuries before the West. This awareness goes back into indefinite antiquity, and seems to have been a natural attitude based on the Chinese view of balance in nature, and consequently of balance in diet. As early as the fourth century BC there were Imperial Dietitians. But textual evidence of overt awareness of deficiency diseases commences in the book, circa 200 AD, of the famous doctor Chang Chi (often called 'the Galen of China'), entitled *Systematic Treasury of Medicine*. Chang gives vivid accounts of deficiency diseases and suggests dietary treatments. Although he did not have a knowledge of vitamins, the food he recommends would have been rich in the vitamins necessary to cure the patients. He presumably knew which foods to recommend as a result of much trial and error over the years.

The well-known literary figure Han Yu (767-824) observed in one of his essays that the disease beriberi (which is caused by deficiency of Vitamin B1) was more prevalent south of the Yangtze river than north of it. A twentieth-century study of the incidence of beriberi in China found that this was quite true. The observation of Han Yu

twelve hundred years earlier was thus verified in modern times. The normal human daily requirement of Vitamin B1 is 300 to 350 international units. North of the Yangtze the study found an average intake of 450 to 690, but south of the Yangtze it was only 250 to 322. This was because in the southern area people eat rice which when polished and washed has no husk and hence no Vitamin B1, whereas in the northern area people eat wheat and millet, and thus consume plenty of the vitamin.

The most prominent author on the subject of dietary deficiencies and diseases was Hu Ssu Hui, who was Imperial Dietitian between 1314 and 1330. He wrote a book called *The Principles of Correct Diet* which is the Chinese classic in this field and is collected from previous works, many of which have since been lost. In this book, Hu describes the two types of the deficiency disease beriberi (recognized today as the 'wet' and 'dry' types), and the remedies which he proposes are essentially diets rich in Vitamin B1, as well as many other vitamins.

### For the cure of 'dry' beriberi

Cook one big carp with half a pound of small red beans, two-tenths of an ounce of *ch'eng*-fruit skin, two-tenths of an ounce of small dried peppers, and two-tenths of an ounce of dried grass seed. Let the patient eat it.

### For the cure of 'wet' beriberi

a) Make a soup of rice and horsetooth vegetable, and let the patient drink it on an empty stomach early in the morning.

b) Cook 16 ounces of pork with one handful of onion, three dried grass seeds, pepper, fermented beans and rice (half a pound) and let the patient eat it in the morning.



LEFT (9). Deficiency diseases were recognized in China by at least the thirteenth century A.D. Here we see the front panel to the classic discussion of the subject *Principle of Correct Diet* by Hu Ssu Hui, published in 1330. The picture shows nutrition specialists giving a consultation to a patient. The caption reads: Many diseases can be cured by diet alone.

In Plate 90 (page 138) we see the frontispiece of Hu's book, published about 1330. Two dietitians are seen in conference about a patient's diet. The motto in the upper right hand corner states 'Many diseases can be cured by diet alone.'

## DIABETES

SUN SHEN-CHUN, M.D.

Diabetes was originally called *hsiao k'o* in China, which means 'dissoative thirst'. This was very appropriate, because diabetics have an unnatural thirst and pass vast amounts of urine. In the *Yellow Emperor's Manual* of the second century BC, diabetes is described at length. And the book pertinently says: 'A patient suffering from this disease must have been in the habit of eating many sweet delicacies and fatty foods.' Even from this period, the Chinese showed astonishing diagnostic acumen about diabetes.

We do not know when the Chinese first noticed that diabetics had excess sugar in their urine, but this was mentioned in the seventh century AD by the physician Chen Ch'uan, who died in 642. His book, *Old and New Tried and Tested Prescriptions*, is apparently lost, but key passages are quoted in a later book by Wang Tao, dating from 752 and entitled *Important Medical Formulae and Prescriptions Now Revealed by the Governor of a Distant Province*. Wang quotes Chen as follows:

The *Old and New Tried and Tested Prescriptions* says that there are three forms of diabetic affection. In the first of these the patient suffers intense thirst, drinks copiously, and excretes large amounts of urine which contains no fat but flakes looking like rolled wheat bran, and is sweet to the taste. This is diabetes (*hsiao k'o ping*). In the second form the patient eats a great deal but has little thirst. In the third form there is thirst but the patient cannot drink much, the lower extremities are oedematous [swollen with excessive tissue fluids] but there is wasting of the feet, impotence and frequent urination.

The first form above is the common *diabetes mellitus*, and the second is the form of it where the patient eats vast quantities of food. As for the last form, this may simply refer to diabetes in obese patients, for obesity is a complicating factor for diabetics. The reference

to the feet may be an observation of the problem diabetics have with poor circulation. If the diabetes gets too serious or if the sufferer wears shoes which are too tight and indulges in the use of hot-water-bottles on his feet, he can develop complications so serious in terms of boils, inflammations and so on that these can even lead to gangrene.

Also in the seventh century, the physician and bureaucrat Li Hsuan wrote an entire monograph on diabetes, and attempted to explain the reason for the sweetness of the urine in diabetic patients. He wrote:

This disease is due to weakness of the renal and urinogenital system. In such cases the urine is always sweet. Many physicians do not recognize this symptom. The cereal foods of the farmers are the precursors of sweetness; the methods of making cakes and sweetmeats mean that they all very soon turn to sweetness. It is the nature of the saline quality to be excreted. But since the renal and urinogenital system at the reins is weak it cannot distil the nutrient essentials, so that all is excreted as urine. Therefore the sweetness in the urine comes forth, and the latter does not acquire its normal colour.

Another seventh-century physician, Sun Ssu Mo, wrote about the year 655 in his book *A Thousand Golden Remedies* that with diabetes, three things must be renounced, wine, sex, and eating salted, starchy cereal products; if this regimen can be observed, cure may follow without drugs.

Thus, by the seventh century AD, the Chinese had published their observations on the sweetness of urine of diabetics, tried to come up with an explanation for it, and proposed a dietary regimen for control of diabetes which was not far from the modern method of avoiding alcohol and starchy foods.

By 1189, in *Medical Discourses*, the physician Chang Kao also noted the importance of skin care in diabetics and the danger of the slightest skin lesions: 'Whether or not such patients are cured, one must be on the watch for the development of large boils and carbuncles, should these develop near the joints the prognosis is very bad. I myself witnessed my friend Shao Jen-Tao suffering from this disease for several years, and he died of the ulcers.'

It should be mentioned that many of the cases of diabetes which occurred in Chinese history, especially



of prominent people, were evidently caused by metabolic poisoning. This was yet another of the dangers of taking the notorious elixirs of immortality, which tended to be full of lead, mercury, and even arsenic.

The sweetness of the urine of diabetics was also known to the Indians, though it is difficult to date the Indian texts, unlike the Chinese. The sweetness of the urine of diabetics was only discovered in Europe about 1660 by Thomas Willis, and published in 1679. In 1776 Matthew Dobson identified this sweetness with sugar, and only in 1815 was the sugar specified as glucose. In terms of their anticipation of the West, the Chinese were ahead of Europeans by over a thousand years in identifying and attempting to control diabetes, though they never connected the disease with the pancreas or had any knowledge of insulin (first isolated in 1921 in the West). It was quite an achievement for the seventh century for the Chinese to arrive at this insight. All those who pass urine that tastes sweet but has no fatty flakes floating on it are suffering from diabetes.

## USE OF THYROID HORMONE

Goiter is an enlargement of the thyroid gland, seen as a swelling in the neck. By the seventh century AD at the latest, the Chinese were using thyroid hormone to treat goiter. This practice may have started earlier but

in the seventh century Chinese physicians described the technique in writing *The first, Chen Ch'uan*, died in 642 AD. His book, *Old and New Tried and Tested Prescriptions*, which some attribute to his younger brother, Chen Li-yan, gives three uses for the hormone obtained from thyroid glands of geese and rats. In one prescription, he recommends that the physician wash one hundred thyroid glands in warm water, remove the fat, dry them and chop them up. He should then mix them with jujube dates and make them into pills to be swallowed by the patient.

In another prescription, he suggests that a single thyroid gland be removed from a sheep, the fat taken off, and the gland put raw into the mouth. It should be sucked by the patient until all the juice possible has been extracted and swallowed. Then the gland itself should be eaten.

Since the goiter may on occasion be a tumour rather than an enlargement of the thyroid gland caused by gland malfunction, it is necessary to distinguish between the two conditions. This the Chinese did at the time. A near contemporary of Chen Ch'uan, Ts'ui Chih-T'i, who flourished about 650 AD, wrote a book in which he clearly distinguished between solid neck swellings which could not be cured (tumours) and movable ones which could be cured (real goiter).

Wang Hsi used the thyroid glands of various animals, including pigs and sheep, for the treatment of goiter. His method involved a drying the glands to







another esoteric product of the quest for immortality. And it certainly did give the gift of life to many.

Inoculation has certain dangers, as well as certain advantages, which set it apart from the later technique of vaccination. When one is inoculated, one has the live virus inserted into one's body. When the process is successful, one is certainly immune for life. But the process can simply be one of direct exposure to the disease, so that one ends up with smallpox. With vaccination, the immunity conferred is only temporary, so that vaccinations have to be given every few years as 'boosters'. This is because vaccination uses dead viruses or some other kind of denatured virus (perhaps a related one) which cannot actually give one the disease.

At first sight it looks as if inoculation against smallpox must have been madness. Were not people just being given smallpox every time? The answer is no. And here we find the subtlety of the Chinese inoculators to be truly astounding. They practised a variety of methods for the attenuation of the deadly virus so that the chances of getting the disease were minimized and the chances of immunity were maximized.

First of all, there was a strong prohibition against taking the smallpox material from people who actually had the disease. It was recognized that this would simply transmit it. They conceived of the inoculation as a 'transplant' of pox material imagined as being like bean sprouts which were just germinating. 'To inoculate' in Chinese was called *chung tau* or *chung mai* - meaning 'to implant the germs', or 'implant the sprouts'.

The method used was to put the pox material on a plug of cotton, which was then inserted into the nose. The pox was thus absorbed through the mucous membrane of the nose and by breathing (The technique of scratching the skin and putting the pox on the scratch seems to have developed long afterwards, possibly in Central Asia as the technique spread westwards.)

Ideally, inoculators chose pox material not from smallpox patients but from persons who had been inoculated themselves and had developed a few scabs. They also knew the difference between the two types of smallpox - *Varicella major* and *Varicella minor*, and they chose pox material from the latter, which was a less virulent form. Indeed the favourite source of pox material was from the scabs of someone who had been inoculated with material from somebody who had been inoculated with material from somebody who had been inoculated. In other words, a

several generations' attenuation of the virus through multiple inoculations.

But there were other artificial methods used to attenuate the virus even further so that it would be safer still. Here is one account from a work on *Transplanting the Smallpox* by Chang Yen in the year 1741:

**Method of storing the material.** Wrap the scabs carefully in paper and put them into a small container bottle. Cork it tightly so that the activity is not dissipated. The container must not be exposed to sunlight or warmed beside a fire. It is best to carry it for some time on the person so that the scabs dry naturally and slowly. The container should be marked clearly with the date on which the contents were taken from the patient.

In winter the material has *yang* potency within it, so it remains active even after being kept from thirty to forty days. But in summer the *yang* potency will be lost in approximately twenty days. The best material is that which had not been left too long, for when the *yang* potency is abundant it will give a 'take' with nine persons out of ten, but as it gets older it gradually loses its activity, giving perhaps a 'take' with only five out of ten people - and finally it becomes completely inactive, and will not work at all. In situations where new scabs are rare and the requirement is great, it is possible to mix new scabs with the more aged ones, but in this case more of the powder should be blown into the nostril when the inoculation is done.

Needham comments on this and similar passages:

Thus the general system was to keep the inoculum sample for a month or more at body temperature (37°C) or rather less. This would certainly have had the effect of heat-inactivating some 80 per cent of the living virus particles, but since their dead protein would have been present, a strong stimulus to interferon production as well as antibody formation would have been given when inoculation was done.

In other words, 80 per cent of the smallpox viruses with which the Chinese were inoculated would have been dead ones which could not have given anyone

# 圖 空 四



LEFT 9/11 This watercolour of a child with smallpox is from a late seventeenth or eighteenth-century manuscript entitled *Methods of Treating Smallpox*. This apparently unpublished work by an unknown author appears to have been used as a source for the book published later (in 1757) entitled *Golden Mirror of Medicine*. The three Chinese characters read 'Driving of the Four Emponcesses, Voids, Holes and Hairs' refer to son's technical medical terminology of that time, as the meaning is otherwise unclear unless it refers to the poxes covering all four limbs (Collection of Robert Temple)

Inoculation against smallpox in China did not become widely known and practised until the period 1567–72, according to the author Yu T'ien-Ch'iu. Vivid descriptions of the practice are recorded by Yu Chang in his book *Miscellaneous Ideas in Medicine*, of 1643.

During the seventeenth century, the practice spread to the Turkish regions, and it was there that it came to the attention of Europeans. The wife of the British Ambassador to Constantinople, Lady Mary Wortley Montagu (1689–1762), allowed her family to be 'variolated' in 1718. Four years before this, E. Timoni had published an account of the practice in the *Philosophical*

smallpox. Instead, they would (as with vaccination) have stimulated the body to produce antibodies against smallpox as well as the substance interferon which assists the immune system in general. So only about 20 per cent of the poxy material was 'live', and that was in as attenuated a form as it was possible to obtain, and of the *Variola minor* variety. Thus, traditional Chinese smallpox inoculation was about as safe as it could be, and every conceivable dodge was used to minimize the risk of its actually giving anyone smallpox.

*Transactions of the Royal Society* in London, and two years after that, J. P. Lattini published a further account in the same source. So the process was being much discussed in London and Lady Mary must have been encouraged by that to take her bold step. By 1721, variolation (called then 'engrafting') began to be widely practised in Europe as protection against smallpox. We owe to this transmission from China the later developments of vaccinations and the science of immunology itself.

# Part 6

## THE DECIMAL SYSTEM







# A PLACE FOR ZERO

More of us rely now for correct figures than we did many years ago. By millions of people all round the world, modern technology would collapse and be unable to function. Zero is essential to the efficient carrying out of mathematical computations. In fact, it is one of the most important in history. But when we speak of an invention, we may speak of two different things. First, a blank space was left for zero. This was obviously the first important step forward. Then an actual symbol for zero was written in the blank space. But this was largely a discovery. For, since the space was there, it hardly needed writing. It was as if had something written in it.

## 難問生師



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We know for certain that it was the Chinese who invented the use of a blank space for zero. As for the actual symbol '0' we suspect that it too first began in China, but the evidence is less clear for that. The blank space on the Chinese counting board representing zero, dates at least as far back as the fourth century BC. Its use was perfectly simple. The number 405, for instance, would be 'written' 'four blank five', or four hundreds, no tens, five units.

The traditional story for the origin of the symbol '0' for zero, as told in the West, is that it was invented in India in the sixth century AD. It may be seen in an inscription at Gwalior dated 870 AD. However, in actuality, the zero can be traced back earlier than this. It may be seen in inscriptions in Cambodia and Sumatra, both dated 683 AD, and on Bangka Island, off Sumatra, dated 686 AD. Experts believe that these inscriptions, which antedate the use of the zero in India, indicated that the zero came to India from China by way of Indo-China.

For many centuries the Chinese seem to have felt no need for an actual symbol for zero. On the counting board, the blank space was entirely adequate. It was the Chinese tradition not to include calculations in mathematical treatises, but merely to give problems and their solutions with little or no indication of the methods used: thus it was at first only in the actual recording of numbers that the need arose, and then, simply, a blank was left. When this was eventually seen to be insufficient, it is probable that the zero symbol evolved as a circle drawn round the blank space.

Absolute priority for the zero symbol is not claimed for China, since its first appearance in print is not until 1247, though there are firm grounds for believing it was used at least a century earlier. No one knows, and perhaps no one will ever know, where the actual symbol was first used or when.

## NEGATIVE NUMBERS

### SECOND NEGATIVE

Westerners had a great mental struggle to accept negative numbers. These are numbers with a minus sign in front of them. To the ordinary man in the street who is not concerned with mathematics, negative numbers may seem insignificant or impossible. 'How can minus ten exist?' someone might say. 'Or if it does, it has no relation to the real world.'

But this is not true. Minus ten dollars in your bank account is real enough: you will have to pay in eleven

dollars before you have a dollar in credit. But it is better to be minus ten dollars than minus a hundred. From this example we can begin to appreciate that as soon as anything is expressed in mathematical language, negative numbers become essential for a proper description. And yet before the Renaissance, the West did not have them.

What was lacking in the West, however, was common in China. Negative numbers were recognized and used there by the second century BC. They occurred frequently on the counting board, and were represented by black rods, positive numbers being represented by red ones. Alternatively, square-sectioned rods represented negative numbers while triangular-sectioned ones represented positive numbers. If no special rods were available, a number on the counting board would be represented in a slanting position to set it apart from the positive numbers, as was done by the mathematician Liu Hui in the third century AD.

The law of signs, for plus and minus, was partially stated in a Chinese mathematical classic of the first century AD, but occurs full-blown on numerous occasions. In medieval Chinese writings stated overdy for instance in the book *Introduction to Mathematical Studies* of 1299. The Chinese found no difficulty in the idea of negative numbers. In this, they were seventeen hundred years ahead of the West. It was not until 630 AD that the mathematician Brahmagupta began to use negative numbers in India. In Europe, negative numbers first appear in a book by the Greek mathematician Diophantus (about 275 AD) only to be dismissed as 'absurd' when occurring as the solution of an equation. The first acceptance of negative numbers in Europe was in the mid-sixteenth century when the great Renaissance genius, Jerome Cardan (G.rolamo Cardano) published his book on algebra entitled *The Great Art*, in 1545. In the book Cardan recognized the negative numbers he obtained in solutions of various equations, and he stated simply but clearly the laws of negative numbers. For instance, in speaking of square roots, he said 'there are two solutions, one plus and one minus, which are equal to each other.' He called a negative number *debitum*. But the positive numbers occurring as solutions to equations, Cardan called 'true solutions', whereas the negative ones he called 'fictitious solutions'. Therefore, though Cardan fully accepted negative numbers in mathematical operations and was prepared to treat them as normal for the sake of computation and calculation, he did not take the modern view that negative numbers can represent non-fictional phenomena. Cardan was polite to them, but he did not take them seriously.

## EXTRACTION OF HIGHER ROOTS AND SOLUTIONS OF HIGHER NUMERICAL EQUATIONS

DAVID S. SMITH

David S. Smith, the great historian of mathematics, wrote in reference to the solution of higher numerical equations: 'Indeed, this is China's particular contribution to mathematics.' This is certainly true. China seems to have been the birthplace of such mathematical processes, which did not arise in Europe until the fourteenth or fifteenth century, and even then remained largely undeveloped for some time.

In the first century AD the Chinese mathematical classic *Nine Chapters on the Mathematical Art* was compiled. One of the algebraic problems given in this work is to find the cube root of the number 1,860,867. (The answer is 123.) The method used is similar to 'Horner's method', developed by W.G. Horner in 1819 in Europe.

Horner's process is a simple and elegant method of numerical calculation. It is so fundamental that it is generally used as the standard method of extraction of a square root. It is a technique of estimating a root of an equation by approximation again and again, each time more accurately than in the preceding step. Horner did this by increasing decimals, whereas earlier (in 1767) the Comte Lagrange had done it by continued fractions. Lagrange's method had been more cumbersome because the resulting fraction had to be converted to a decimal. This affords an interesting parallel to what happened in China: a 'Lagrange method' using fractions was developed there by the first century BC (nineteen hundred years ahead of Lagrange), and it was improved to a Horner method in the third century AD by Liu Hui (sixteen hundred years before Horner, see page 142). The methods were essentially specific applications of those generalized in Sturm's Theorem, which was formulated by J.C.F. Sturm in 1834, and based on their work.

Numerical equations of higher degrees than the third—that is, involving powers higher than cubes—make their appearance in print in China in the year 1245, in the *Mathematical Treatise in Nine Sections*, by Ch'in Ch'ü-Shao. In this work are included equations involving higher powers, such as:

$$x^3 + 763,200x^2 - 40,642,760,000 = 0$$

It should be said that the Chinese did not write such equations in symbols, but spelled them out. They were, nevertheless, proper equations. In two books published in 1248 and 1259, *Tse Yüan Hsi Chung* and *I K'ai Yüan Tsuei*, the mathematician Li Yeh had equations like these:

$$ax^6 + bx^5 + cx^4 + dx^3 + ex^2 + fx + g = 0$$

and

$$-ax^6 - bx^5 - cx^4 - dx^3 - ex^2 - fx - g = 0$$

As Needham says: 'Early Greek and Indian mathematics seem to have contributed little or nothing to the solution of higher numerical equations' in the mid-sixteenth century. Niccolo Tartaglia and Jerome Cardan were able to solve the cubic equations, but both of them considered that equations of higher degrees were not relevant to the real world, Cardan believing that algebra was complete with the cubic equations which related to the third dimension (than which he believed there could be none higher). Cardan's pupil Lodovico Ferrari did, however, work on equations of the fourth degree. But, by and large, Europeans were far less willing to consider higher equations in the sixteenth century than the Chinese were in the thirteenth. The first actual solutions of cubic equations in China were by Wang Hsiao-T'ung in the seventh century AD, and the first in Europe, in the thirteenth century, were by Leonardo Fibonacci, who is thought to have been influenced by Chinese sources.

## DECIMAL FRACTIONS

DAVID S. SMITH

It is hardly surprising that, with the decimal place system so well established in China, decimal fractions first occurred there. The earliest definite traces of them appear in connection with measurements. Decimal systems of measurement implied that when something exceeded a unit of whatever size was encountered, the fraction left over could be expressed in terms of the units smaller by a power of ten. This did not require a great mental leap, and was in fact a more or less routine matter. The system probably



the area of higher quadratic equations on the red square roots and the equations could be compared one by one. He also gave an algorithm for solving equations of any degree. He published his first book in 1592 and his second in 1609. But the greatest triumph of his life was the publication and success of decimal fractions, which led to their adoption in Europe. A further

step several centuries later. A surviving inscription by Liu Hui on a standard measure of volume can be precisely dated to the year 5 AD and speaks of a length related to  $\frac{1}{10}$  of certain units.

The Chinese were the first to use decimal fractions in their work of mathematical life and this can be found in the writings of Liu Hui in the mid third century AD. The fractions occur in two contexts: weights and measures and in solutions to equations in his commentary on the classic *Nine Chapters on Mathematical Art* (first century BC). Liu Hui explained

in 1353 feet. The *Nine Chapters* itself has spoken of extracting square roots and getting results which were not integral: that is, which left fractions. But fractions were not good enough for Liu Hui, who was as Needham says, 'concerned about what he called the 'useless numbers' and stated that the answers should be expressed as a series of decimal places. Needham adds 'These decimal roots were calculated with counting rods and the results expressed in decimal fractions'.

Although developed quite early by the third century AD, decimal fractions were not universally adopted in China. The major obstacle to this was that the Chinese were so advanced and skilled at manipulating ordinary fractions that many of them simply did not feel the need for decimal fractions.

But decimal fractions do continue to crop up in the literature. The official history of the Song Dynasty, written up in 1084, gave the decimal fraction  $\frac{3}{10}$  as  $\frac{3}{10}$  and the decimal fraction  $\frac{3}{10}$  as  $\frac{3}{10}$ . The first person



to use the decimal notation was appeared in the year 1592 of the Chinese calendar.

Full blown decimal fractions applied to operations generally and constituting a general system and approach appeared in the thirteenth century. The first person to use decimal fractions was Ch'iu Chiu-Shao. From the Chinese the idea of the decimal system passed to Arabia. The first person to use the decimal system in Europe was Simon Stevin, who published a work upon it in 1585. The first man who comprehended the significance of a decimal system to have been Chinese.

Simon Stevin added that 'the first to show by a special treatise that he understood the significance of the decimal fraction was Stevin, who published a work upon it in 1585 in Flemish, followed in the same year (1585) by a French translation'. Simon Stevin is known to have lived in the 16th century. The first person to use the decimal system in Europe was Simon Stevin, who published a work upon it in 1585. The first man who comprehended the significance of a decimal system to have been Chinese.

Algebra and geometry developed independently. Today we could not possibly do without their intimate partnership. In spite of centuries of the use of abstract algebra, we still need modern technology to make the connection between algebra and geometry possible through abstract thinking.

The most primitive form of algebra (algebraic geometry) describing how building the structure is constructed, the first step is to describe the shape of the structure, describing the geometry, surface, and structure. The first people to do this was of China, expressing geometrical shapes by equations, was the Chinese.

The Chinese book of the mathematics, called the "The Great Mathematical Manual" giving a list of geometrical propositions in algebraic form. It describes geometrical figures by algebraic equations. Throughout Chinese history when it came to consider geometry, algebra was regularly employed.

The first technique of geometry in the Chinese book of the mathematics, it is known as the "The Great Mathematical Manual" was given by the Chinese to the Arabians in the thirteenth century, during the year 1242 or 1243 (Khanbaliq was the main trade routes between China and the West). The first European who adopted the method appears to have been Leonardo Fibonacci, who in his book "Fibonacci's Book of Squares" of 1220 used algebra to solve geometrical problems relating to the area of a triangle.

Since the Chinese book of mathematics, algebraic geometry only did that was to give the first analytic geometry, which is the first expression of these principles in which every geometrical object and every geometrical equation can be reduced to the form of numbers. It was developed in Europe by the mathematicians Simon Stevin and René Descartes in the seventeenth century. The same man to find out that the Chinese, through enough, never made the necessary study of these theories, which gives such basic forms as ellipses, parabolas, and hyperbolas. This was not in the Chinese book of mathematics, Nor did any of the Europeans who developed analytic geometry, that they were thinking three equations, the geometrical figures, but the Chinese had always done so in the form of geometrical figures and equations.

It is curious that the Chinese should have been so slow to catch up with the world, but they have often been said that they were too much concerned with the applying of mathematics to every aspect of the physical world, which is called "the mathematics of the world". Nor did the Chinese ever make use of the algebraic geometry, and perhaps that was their failure to follow through on the method of geometry, which was the first modern algebra.

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The decimal number  $\pi$  can be compared to an infinite number of decimal places. It separates the units of the circumference of a circle to its diameter, a relationship which cannot be shared by areas of whole numbers. (It is needed to compute the area of a circle or volume of a sphere.) The value of  $\pi$  was compared by Archimedes to three decimal places, and by Ptolemy to four decimal places. But after that for 1450 years no greater accuracy was achieved in the Western world. The Chinese, however, made great strides forward in computing  $\pi$ .

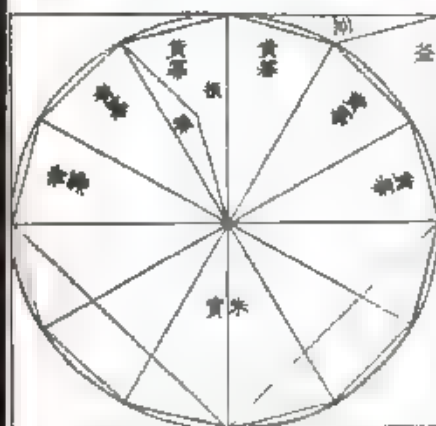
One way in which the ancient mathematicians tried to approach an accurate value of  $\pi$  was to describe polygons with more and more sides to their inside circles, so that the area of the polygons (which could be computed) would come ever more closely approach the area of the circle. Thus, they would try to find a value for  $\pi$  since the circle area was found by using the formula containing it. If they should measure the diameter and square a polygon whose area they knew was the circle, the only unknown needed would be  $\pi$ , which would then be calculated. Archimedes used a 96-sided polygon, and decided the actual value between 3.142 and 3.140.

The Chinese tried to catch up on  $\pi$  in the same fashion, but they were better at it. Liu Hui in the third century started by inscribing a polygon of 192 sides in a circle, and then went on to inscribe circles of 3972 sides which approximated area down. He was able to calculate values of  $\pi$  of 3.14159. He suggested the Chinese use such the Greek  $\pi$ .

The decimal leap forward came in the fifth century, when two advanced values for  $\pi$  appeared in China. The mathematicians Zhu Chongzhi and Zu Kengzhi (father and son), by means of calculations which have been lost, obtained an approximation of  $\pi$  to six decimal places, 3.1415929206. The only way for the inscribing of the polygons is known to have been 10 four corners. This value of  $\pi$  was recorded in historical records of the period, but the actual basis of their computations have vanished since the centuries, and the generation of Wang Xi perhaps lost of his book *Chuan Shu* (Nine Chapters) years later, the mathematician Shen Yu (about 1370-1400) no longer knew the value of  $\pi$ . He inscribed polygons in circles with the common number of 46,080 sides. By this means he measured the value given by the Zu family.

The Zu family had a lead in the computation of  $\pi$  of about 1200 years. They had 1450 years in the year 1000.

## 圖田弧



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之實果令損益  
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半密於約率  
乃祖氏之約率  
失其實矣微率  
與祖氏之約率  
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## PASCAL'S TRIANGLE

Blaise Pascal (1623-62) gave his name to a triangular array of numbers such as the one below



If you study this array of numbers you will see that every number in it is equal to the sum of the two numbers above it on either side, except for the 1s of course. Thus, 15 is the sum of the 10 above it to the left and the 5 above it to the right. And 35 is the sum of the 15 above it to the left and the 20 above it to the right.

But Pascal's Triangle is not just an intriguing oddity for people who like to play around with numbers. It actually gives the numerical coefficients (the numbers which go beside the letters) of the series of solutions to the raising to successive higher powers of a binomial. A binomial consists of two

numbers added together, represented as  $(a + b)$ . In the triangle, each successive line across gives the numbers which go with the solutions. Thus, if  $(a + b)$  is raised to the power of one, it stays exactly as it is, and the first line gives the coefficients of the result 1 and 1, for a plus b. But if  $(a + b)$  is raised to the second power, meaning that it is squared  $(a + b)$  times  $(a + b)$  gives us the answer  $a^2 + 2ab + b^2$  and it will be immediately obvious that the numbers beside the letters of this answer are given by the second line across in the triangle, namely, 1, 2, 1. And so on as  $(a + b)$  is cubed then raised to the fourth power, and fifth power, on indefinitely.

Now, it may seem that this too is merely an oddity. But not so. As one raises a binomial to higher and higher powers, one soon can lose one's way and wonder what the numerical coefficients are actually going to be in the solution. But a glance at an extended Pascal Triangle can give the answer instantly, thus providing one with solutions to the problems without having to multiply them out. The Triangle is a wonderful time-saver and one of the fundamental steps in getting mathematics really on its feet. But although it bears the name Pascal's Triangle, it was by no means invented by Pascal. He merely put it in a newer form in the year 1654. In fact, this Triangle was invented in China. It may be seen depicted in a Chinese book of 1343 AD by Chu Shi-chen, entitled *Precious Mirror of the Four Elements*. Even here it is called The Old Method.

As did indeed it well for it was known in China by 1100. The mathematician Chia Hsien expounded it at that time as 'the tabulation system for unlocking binomial coefficients' but its first appearance is thought to have been in a book of that date now lost, entitled *Piling-up Powers and Unlocking Coefficients*, by Liu Ju-Hsieh.

The mathematician and poet Omar Khayyam discussed the 'Pascal' Triangle somewhat indirectly about 1110. We do not know whether he got it from China or invented the elements of the system independently. But the first appearance of the Triangle in print in Europe was on the title page of the book on arithmetic of Petrus Apianus in 1527. Several succeeding mathematicians, such as Michael Stifel, conveyed it. And the Italian Nicole Tartaglia, who was something of a scoundrel, claimed it as his own invention. But as far as we know, the inventor was indeed Liu Ju-Hsieh 427 years before the appearance of the Pascal Triangle in Europe.



ABOVE: The famous Pascal Triangle (1629-1662) French mathematician and scientist after whom Pascal's Triangle is named by some. He wrote about it in 1654. It was known in China 427 years before and a little centuries before this.



# 古法七藥方圖



一積 二積 三積 四積 五積 六積 七積

# Part 7

## MAGNETISM

### THE FIRST COMPASS

OF THE LATERALITY

Needham wrote:

The first compass was a very simple one, and it was made of a piece of iron, which was magnetized by rubbing it with a piece of lodestone. The compass was used to find the direction of the magnetic poles, and it was the first step towards the discovery of the magnetic field.

thus used to

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Europe. Needham comments:

The first compass was a very simple one, and it was made of a piece of iron, which was magnetized by rubbing it with a piece of lodestone. The compass was used to find the direction of the magnetic poles, and it was the first step towards the discovery of the magnetic field.

CHINESE 11th Century - the first compass of the new - 11th century (the 11th century in which the

for north and south





LEFT 1/2 A working model of the oldest instrument in the world which is known to be a compass. The spoon or needle is of magnetized stone and the plate is of bronze. The circular centre represents Heaven and the square plate represents Earth. The handle or the spoon points south. The spoon is a symbolic representation of the Great Bear. The plate bears Chinese characters which denote the eight main directions of north, north-east, east, etc. and various gradations from one Chinese degree marks which were correlated with directions. Separately marked are the finer gradations of twenty-four non-pass points and along the outermost edge are the twenty-eight mansions. This type of compass has been scientifically tested and found to work tolerably well. It was used not for navigation but

use of a single thread only for the suspension would avoid twisting effects. That the thread should be of silk meant that it would be a continuous fibre, unlike a thread of hempen yarn (cotton was almost certainly not known in China in his time), in which shorter fibres would be spun together under tension. That the silk thread should be new would imply an evenly distributed elasticity.

We also have an explicit account of the use of the magnetic compass for navigation, dating from before the first European mention. It is from a book by Chu Yü, son of a former high port official and then governor of Canton. The book is quaintly called *P'ingchow Table Talk*, and dates from 1117. Chu writes:

According to the government regulations concerning sea-going ships, the larger ones can carry several hundred men, and the smaller ones may have more than a hundred men on board. The ship's pilots are acquainted with the configuration of the coasts, at night they steer by the stars, and in the day-time by the Sun. In dark weather they look at the south-pointing needle. They also use a line a hundred feet long with a hook at the end, which they let down to take samples of mud from the sea-bottom, by its appearance and smell they can determine their whereabouts.

The author Meng Yuan-Lao wrote in his *Dreams of the Clones of the Eastern Capital* about 1126: 'During dark or rainy days, and when the nights are overclouded

sailors rely on the compass. The Mate is in charge of this. And in the book *Illustrated Record of an Embassy to Korea in the Hsiao-Ho Reign Period* from 1124, the author Hsu Ching wrote: 'During the night it is often not possible to stop because of wind or current drift, so the pilot has to steer by the stars and the Great Bear. If the night is overcast then he uses the south-pointing floating needle to determine south and north. These references are also both prior to any Western mention of the compass.

The compass had in fact existed for centuries before this in China, but Needham has established that it was only late in its history that it came to be used for navigation at sea: the most probable period being between 850 AD and 1050. Before we discuss the history of the compass prior to its use in navigation we should note a point of technological detail. Needham mentions that the French scholar L. de Saussure, who was himself a keen sailor,

RIGHT 1/3 A simple manner's compass, a bowl of water on which floats a magnetized steel needle pointed north and south. The main mark for South is known, painted in red but is not at the centre. It is the fourth from the



this compass is not orientated properly for the purpose.



100 T (M). A drawing from a Han Dynasty bronze mirror of a spiral magnet is not a very good drawing for clarity. The spiral figure is looking at a small object of the size shown in Plate 109.

100 T (M). R. e. b. e. r. g. Z. u. r. i. c. h.

pointed out that the use of the compass in navigation depended to some extent upon metallurgical procedures for the production of steel. Soft iron does not retain its magnetism long, or show it strongly, for extended voyages magnetized needles of good steel would have been desirable. De Saussure considered that the Chinese narratives of deep-water sailing, which we have from the thirteenth century AD, such as the embassy to Cambodia, would not have been possible without steel needles. It may well be that good steel needles were available to the Chinese several centuries before Europe had them. Failing them, lodestones had to be carried on board every ship for remagnetization, as Bromhead has described, quoting from a book on navigation of 1597. Thus for 600 years the lodestone was an economic mineral. [Magnets are remagnetized by being stroked appropriately by naturally magnetic lodestones.]

The Chinese were far advanced in their steel manufacturing capabilities (see pages 53 and 76).

The earliest and simplest form of compass was obviously a naturally magnetic piece of lodestone used to indicate direction and this long preceded the more advanced idea of using needles. How far back did such lodestone compasses go in China, and if they were not immediately used for navigation, to what uses were they put?

We can trace the Chinese use of the lodestone compass back as far as the fourth century BC with certainty. The textual mention of it occurs in the *Book of the Devil Valley Master*, which dates from that time. The author is unknown but is thought possibly to have been the philosopher Su Chin. The passage says: 'When the people of Cheng go out to collect jade, they carry a south-pointer with them so as not to lose their way. Another text from the third century BC occurs in the *Book of Master Han Fei*, written by the philosopher of that name. There, we read:



Subjects encroach upon the ruler and infringe his prerogatives like creeping dunes and piled-up slopes. This makes the prince forget his position and confuse west and east until he really does not know where he stands. So the ancient kings set up a south pointer, in order to distinguish between the directions of dawn and sunset.

These are the two earliest known references in world literature to a compass, with the possible exception of some ancient Egyptian texts, the interpretation of which could be disputed and cannot be discussed here. In neither case is the 'south pointer' (and it should be remarked that all Chinese compasses pointed southwards rather than northwards if possible, by preference) mentioned as something new or novel. On the contrary, it is credited to 'ancient kings' even in the third century BC.

In Plate 109 (opposite) may be seen a model of an early Chinese compass, where the pointer is in the shape of a spoon or ladle, which represents the polar constellation of the Great Bear (Big Dipper). Another early form of compass had the pointer shaped as a fish. But with the advent of steel needles these ladles and fish were superseded, at least as far as navigation was concerned. It should be noticed, however, that far more important than the use of the compass for navigation to most Chinese was its use for geomancy. This was a magical technique for aligning houses and cities harmoniously with the breaths and currents of the Earth's forces, which were partly detected with the aid of the compass. The ladle-shaped pointer in Plate 109 is one of these geomantic compasses, and it is doubtful that it could ever have served on board a ship.

We should just mention in passing that what may have been a compass dating from 1000 BC was excavated in Olmec ruins in 1967 at San Lorenzo in southern Veracruz, Mexico. If it was a compass, it is six hundred years older than the earliest Chinese evidence. Needham disputes the interpretation of the object as a compass, and we cannot enter into the controversy here.

## DIAL AND POINTER DEVICES

The earliest Chinese compasses did not have needles. The pointers were shaped as spoons, fish, or even sometimes as turtles. The introduction of a needle was a refinement which made possible a much greater precision of readings on the dial surrounding the pointer. It was at this stage of development that we can say that the Chinese pioneered the world's first dial and pointer devices, which are absolutely fundamental to modern science.

Needham says of this development: 'Probably by the seventh or eighth century AD the needle was replacing the lodestone, and pieces of iron of other shapes, on account of the much greater precision with which its readings could be taken.'

Needles were also used as pointers on computing machines. The use of a needle in a calculating device can be traced back to at least 570 AD in China; it seems to have been in form of abacus based on compass readings. A description of it survives in a book entitled *Memoir on Some Traditions of Mathematical Art* and its accompanying Commentary by Chen Luan (flourished 570 AD). Chen Luan writes: 'In this kind of computing, the digits are indicated by the pointing of the sharp end of a needle. The first digit occupies the *Li* position, that is, pointing full south; second, or two, is *K'un*, south-west; the third, or three, is at *Tu*, full west. And so on. Chen Luan adds that a digit to be multiplied is indicated by the point of the needle, whereas a digit to be divided is indicated by the needle's (differently shaped) tail.

Needham says of this

This technique, which would seem to have been a simple sort of abacus-like device, arising out of the old diviner's board, is elsewhere attributed to, or associated with, the name of Chao Ta, a famous diviner of





Below: A Chinese inventor had to make a magnetic compass, and I believe this may be the first one passed on to the West.



Robert Temple)



Below: A Chinese inventor had to make a magnetic compass, and I believe this may be the first one passed on to the West.



the Historical Chinese



## MAGNETIC DECLINATION OF THE EARTH'S MAGNETIC FIELD

The earth's magnetic field is not constant. It varies from year to year, and the magnetic North Pole is not fixed. The difference between a finger pointing at the true geographical North Pole and a compass needle pointing at the magnetic North Pole is known as the angle of declination. In the USA (variation), it is not constant and continually shifts. By the eighth or ninth century AD at the latest, the Chinese had discovered this magnetic declination.

As Needham says, in doing so the Chinese were antedating European knowledge of the declination by some six centuries. The Chinese were theorizing about the declination before Europe even knew of the polarity. The magnetic compass and the polarity of the Earth's field are not mentioned in any Western writing until 1190 AD, and the Chinese had had the compass for a good fifteen hundred years before that. In our account of the compass (page 162, we quote the medieval Chinese scientist Shen Kua from his *Dream Pool Essays* of 1086. On magnetic declination he wrote 'Magicians rub the point of a needle with the lodestone, then it is able to point to the south. But it always inclines slightly to the east, and does not point directly at the south'.

Here, north is indicated by the character '北' (North) in K'ou Tsung-shih's *Almanac of the Pharmacy of the Enlightened*, of 1116 AD. 'When one rubs a pointed iron needle upon the lodestone proper, it acquires the property of pointing to the south, yet it inclines always towards the east, and does not point due south'.

The oldest precise and thoroughly explicit description of the declination as shown by a needle dates from about 1030-50 AD, and appears in a poem on the magnet written by Wang Chi, founder of the Fukien school of geomancers. (Fukien as a coastal province and home of sailors, gave birth to a school of geomancy which put more emphasis on the compass than elsewhere).

The geomancers' compasses of China discussed under Dial and pointer devices above, preserve centuries-old knowledge of two different compass points showing the magnetic declination at two different times in the past. Two concentric circles of compass points were traditionally embodied in the many circles which such devices bore, showing the magnetic declination at two separate times in history.





LEFT: A diagram showing knowledge of the declination from a geographic treatise of the late tenth century, copied *The Nine Heavens Mysticism* (Blue-Box Sea-Along Manual) (T'ao Tsung-chang is a Taoist mystic, nickname for the cosmic). The diagram is on the

needle, that the compass needle is in a pool of water or mercury. The second and last compass point is out an fixed 7° from each other. The magnetic declination. The ad recorded by the by the eight

Europeans do not seem to have known about the magnetic declination until the early fifteenth century. By 14th-century German sundials were being made with a set of markings rather like those on the Chinese geomancers' compasses, indicating empirical knowledge of the declination. These date from before the voyage of Columbus to America in 1492 and show to be false the traditional story that Columbus discovered the declination when he crossed the Atlantic.

## MAGNETIC REMANENCE AND INDUCTION

Just as boiling water turns to steam and undergoes a change of state, so magnets can become demagnetized by heating. There is a temperature known as the Curie point (after the famous nineteenth-century scientist) at which a magnet loses its magnetism.

But just as steam can recondense into water when it cools, so iron, after being heated to a very high

temperature, can take on magnetic properties as it cools down through the Curie point. It does this under the influence of a magnetic field in which it may happen to lie. This is described as magnetic remanence acquired through the magnetic induction of the cooling iron. Since the Earth has a faint magnetic field, usually called the geomagnetic field, a piece of cooling iron can take on a slight magnetism from the Earth's field alone, as long as the piece is oriented north-south as it cools. The Chinese were aware of this. As Needham says:

Some time before the eleventh century AD it was discovered in China that magnetization could be carried out not only by rubbing the pieces of iron on the lodestone, but by cooling them (quenching) from red heat, through the Curie point, while held in a north-south direction (the Earth's magnetic field).

Wang Ch'i wrote in his *Universal Encyclopedia* of 1609 about magnets and the destruction of magnetization by heating.

The *ch'i* [emanation or subtle force] and influence of the lodestone is truly as if it were living. It has a head and a tail. Its head points towards the north and its tail towards the south. The force of the head is superior to that of the tail. If it is broken into pieces, all of them also have heads and tails. If it is heated in the fire, it 'dies' and can no longer point to the south.

But the text which explicitly describes the induction of remanent magnetism in iron is found in the *Compendium of Important Military Techniques*, by Tseng Kung-Liang, published in 1044. He refers to a fish-shaped magnet which also comes into the account of the compass on page 162. The south-pointing carriage in the following account is not a magnet, but a mechanical navigation device such as has already been described (page 70). Tseng writes:

When troops encountered gloomy weather or dark nights, and the directions of space could not be distinguished, they let an old horse go on before to lead them, or else they made use of the south-pointing carriage, or the south-pointing fish to identify the directions. Now the carriage method has not been handed down, but in the fish method a thin leaf of iron is cut into the shape of a fish two inches long and half an inch broad, having a pointed head and tail. This is then heated in a charcoal fire, and when it has become thoroughly red-hot, it is taken out by the head with iron tongs and placed so that its tail points due north. In this position it is quenched with water in a basin, so that its tail is submerged for several tenths of an inch. It is then kept in a tightly closed box. To use it, a small bowl filled with water is set up in a windless place, and the fish is laid as flat as possible upon the water-surface so that it floats, whereupon its head will point south.

The tightly closed box is thought to have contained a lodestone base. Needham points out that compass needles are placed in boxes with lodestone floors even today, and that a Chinese professor he knew had seen this process, called 'nourishing the needle', practised about 1950 in Anhui Province. It is sometimes necessary to 're-charge' a compass needle by contact with a lodestone. And a needle with magnetism induced by the thermo-remanence clearly described

above could be 'strengthened' or 'nourished', by the additional contact with the lodestone.

The Curie point is not an invariable temperature: it varies according to the material. It is doubtful that the Chinese could actually have measured it, therefore. They merely knew of it empirically, they had observed the results obtained by passing through it, and therefore had some conception of it through knowing the necessity for 'red heat'. Obtaining a magnet through thermo-remanence had the great advantage that a compass could be made without a lodestone. It is easy to see why this was of particular interest to those concerned with military techniques, for so diets on campaign continually have to make shift by expedients, through lack of essential supplies. And, of course, one's lodestone must have been common in the heat of battle or, what is more, in retreat.

The recognition that the iron being magnetized had to be oriented to the Earth's magnetic field indicates some awareness of the existence of that field. As Needham laconically remarks: 'Remanent magnetism is a surprise to meet with in the early eleventh century.' Thermo-remanence was of course known to William Gilbert, who illustrated the forging of a steel rod in the direction of the Earth's field. Gilbert published his book in 1600, and in it declared the Earth to be a magnet. How much of his ideas Gilbert drew from China we do not know, but he was sufficiently aware of Chinese origins to state in *De Magnete* that Marco Polo had brought the magnetic compass to Europe (though, in fact, it had come earlier). And in recognizing the Chinese origin of the compass for Europe, Gilbert was better informed than many a twentieth-century scholar has been.

It must be stressed that by merely using the compass, and realizing that it pointed roughly north and south, the Chinese could have interpreted the whole process as a mere cosmic affinity. But magnetic induction by the Earth's field proved that that field was an *active force*. This was one of the greatest of scientific insights achieved by the Chinese.

OPPOSITE 156. Artisan drawing steel wire and making steel needles to be magnetized and used for compasses. From *Explication of the Secret of Nature*, published in 1637. The needles were to be magnetized by the thermo-remanence process: until red-hot, pointing north-south and quenching in a basin of water. The magnetic effect induced was discovered by the Chinese before the eleventh century, was unknown in Europe until William Gilbert published his book *De Magnete* in 1600.

抽線琢鍼圖









minerals and the first author, Mr. Wang Hsiang-shan, says: 'If the stalk of a certain plant is yellow and elegant, copper will be found; low and stumpy, if the leaves of a certain plant are green and the stalks red, much lead will be found below.'

The early scientist and poet Chang Hui noted about 200 AD that where the narrow-leaved grasses abundant, there is much quantity of haematite (ferrous oxide) below. And about 800 AD Tuan Cheng Shih in his *Mineralogy of Yu Yang* mentions: 'When in the mountain there is a yellow plant, then below copper will be found. When in the mountain there is a red plant, a kind of iron, not then below gold will be found. When in the mountain there is a blue-green plant, then below copper and tin will be found.'

None of the above signs has ever been used in modern times, and there is scope for a new approach. Different awareness that a plant that is deficient in some mineral could be extracted from certain plants is seen in the early Chinese book called *Previous Secrets of the Realm of the King and Hsin* (symbol of metals and minerals). There we are told quite specifically that gold occurs in the rape turnip, silver in a type of weeping willow, lead and tin in mugwort, chestnut, barley and wheat, and copper in the Indian sorrel (*Oxalis corniculata*).

Herbaceous plants are rich in zinc, and Pennycress is zinc-loving, and is rich in zinc. You rich in zinc is indicated by this plant, one of the plants as indicators of deposits goes back many years.



A later book on mineralogy, written in 1700 AD by Li Hsiang-shan, says: 'When there are many pieces of purslane and iron ore, lead is rich. When as a herb and vegetable, purslane is rich in mercury for the metal to be extracted from it by useful processes. Iron and tin are abundant.' The author of this book, Su Shih, mentions having processed 8 tons of iron ore to get 100 lbs. from 10 cattie's weight of dried purslane. Mercury is a deadly poison, and purslane is also apt to be poisonous. The Chinese people have been mining and gathering purslane. Purslane is also used in traditional Chinese medicine.

The early use of plants in mineralogy was mentioned by Nicolaus de Cusa in 1470, before G.F. Henckel in 1760, in his book *Flora Germanica*. However, the first time it was used in a book was by Agricola in 1546. In his book *De Re Metallica*, he mentions that the plants that are rich in copper are the same as those that are rich in lead. In 1760, G.F. Henckel mentioned that the plants that are rich in copper are the same as those that are rich in lead.

Minster informs us: 'Sir Tho. Chaloner Observed the Leaves of the Oak Trees where the Mines are to be of a deeper green than elsewhere and the Bough more spreading the Boles Dwarfish but strong having little sap, and not deep rooted . . . on which he conceived there was included some valuable minerals especially Akin'. This proved to be true. Sir Thomas had visited the alpine mines of Italy and noticed similar vegetation there. This appears to be the first example of geo-botanical prospecting in Europe, and is about 2,000 years later than the beginnings of such methods in China.

## THE FIRST LAW OF MOTION

BY NEEDHAM

Isaac Newton formulated his First Law of Motion in the eighteenth century. It stated that 'every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it'.

Needham's researches have now established that this law was stated in China in the fourth or third century BC. We read in the *Moh Ching*: 'The cessation of motion is due to the opposing force . . . If there is no opposing force . . . the motion will never stop. This is as true as that an ox is not a horse'.

The book *Moh Ching* is the collection of writings of a school of philosophers called Mohists, after their founder and sage Mo Ti (more commonly known as Mo Tzu, which means 'Master Mo'). The Mohists disappeared completely from Chinese history after only a moderate time, and most of their writings remained unread and almost forgotten until recently. Their brilliant scientific insights were also largely lost and made very little lasting impact on later Chinese history. The Mohists were also the only ancient Chinese to consider the subject of dynamics in the theoretical sense, though practical dynamics was continuously applied in the great strides made by Chinese technology and invention.

Sadly although Newton's First Law of Motion was anticipated two thousand years earlier by the Mohists, nothing seems to have come of it. It was only in 1962 that Needham, in the first proper study of Mohist scientific doctrines, published the fact that this great step had ever been taken – but it was a step in soft sand, quickly washed away by the advancing tide of history.

## THE HEXAGONAL STRUCTURE OF SNOWFLAKES

LOUIS N. STANLEY

The knowledge that snowflakes are hexagonal in shape may seem a commonplace to us today. But when the Scandinavian bishop Olaus Magnus wrote about snowflakes in 1555 he believed – despite the abundance of snow in his homeland – that they could be shaped like crescents, arrows, nails or bells, or even like the human hand. Perhaps he did see such bizarre clumps of snow, but the fact that the flakes themselves are always hexagonal eluded him. It was only in 1591 that the Elizabethan genius Thomas Harriot seems to have recognized the hexagonal nature of snowflakes, for the first time in European history. But he only jotted his findings down in his private manuscripts, and did not publish them.

The first European publication announcing the hexagonal nature of snowflakes was in 1611 (English translation first published in 1966). This was a fifteen-page account by the astronomer Johannes Kepler of his observations of snowflakes during the winter of 1610-11, entitled *A New Year's Gift, or On the Six-Cornered Snowflake*.

How impressive it is, then, to discover that the Chinese knew of the hexagonal nature of snowflakes in or before the second century BC. About the year 135 BC, Han Ying wrote a book entitled *Moral Discourses Illustrating the Han Texts of the 'Book of Songs'*. In this work he incidentally referred to what appears at that time to have been common knowledge, as follows: 'Flowers of plants and trees are generally five-pointed, but those of snow, which are called *ying*, are always six-pointed'.

Thus we see that understanding of the hexagonal nature of snowflakes in China preceded such knowledge in Europe by at least 1,726 years, and probably far more. Knowledge of hexagonal patterns in nature seems to have been fundamental to the earliest Chinese proto-science several centuries before the time of Han Ying. The knowledge may extend back to the earliest levels of advanced civilization in China, but Han Ying's mention is the earliest textual evidence in an explicit form connecting hexagonal patterns with snow.

Chinese literature is full of mentions of hexagonal snowflakes. For instance, the sixth-century poet Hsiao T'ung wrote in one of his poems:





The ruddy clouds float in the four quarters of  
the caerulean sky / And the white snowflakes  
show forth their six-petalled flowers

The Chinese were traditionally keen on number mysticism. The number six was correlated with the element water. The greatest Chinese medieval philosopher Chu Hsi, wrote in the twelfth century: 'Six generated from Earth is the perfected number of Water, so as snow is water condensed into crystal flowers these are always six-pointed. Even this late reference is still four-and-a-half centuries before Kepler's book on the snowflake.

The hexagonal nature of snowflakes was very much part of a Chinese cosmic scheme of nature. It was seen as an example of the most extreme form of the *yin* force of the Universe, and as a manifestation of the number associated with the element of water. It was also clearly believed that in forming snow, water condenses into the crystals. Liang Ch'iu, in his book *Records of My Drydrenius*, spoke of water's 'congealing' into snow. 'That flowers of plants and trees are always five-pointed and snow crystals six-pointed is a saying of the old scholars, for since six is the true number of Water, when water congeals into flowers they must be six pointed.

We even have textual evidence of systematic examination of snowflakes in the sixteenth century. For about the year 1600 AD Hsien Tsaichang wrote in his book *Five Assorted Offering Stays*: 'every year at the end of winter and the beginning of spring I used to collect snow crystals myself and carefully examined them, all were six-pointed. He was probably examining his snowflakes under the magnifying power of lenses, which were in use in his day.

Although the Chinese were thus fully aware of the hexagonal structure of snowflakes, they seem never to have investigated it as a mathematical problem in the manner of Kepler. As Needham says, 'the Chinese, having found the hexagonal symmetry, were content to accept it as a fact of nature.'

## THE SEISMOGRAPH

(CONTINUED)

China has always been plagued by earthquakes. The high mountains and precipitous gorges of its crumpled, twisted surface are frequently disturbed by tremors which wreak immense havoc among the people who live there. More than 800,000 people are said to have been killed in three provinces by the great earthquake of 2 February 1556. Full records exist in the Chinese histories of all the major earthquakes over the centuries. These events were often the trigger for food riots, or attempts at rebellion. The imperial government had every reason to want to know as soon as possible when there had been an earthquake in a distant province. First of all, it would mean that grain shipments would be interrupted, which was relevant since taxes were paid in grain. But it would also mean that both food aid and extra military forces would be needed in the afflicted area without delay. Early warning was essential.

A solution was provided by the brilliant scientist, mathematician and inventor Chang Heng, who was Astronomer-Royal during the later Han Dynasty. He also wrote a number of books of which one, *Spiritual Constitution of the Universe*, survives only in fragments, but these are sufficient to show that he envisaged the Earth as a spherical ball suspended in infinite space, with nine continents. Chang Heng was the first in China to introduce the crisscrossing grid of latitudinal and longitudinal lines in geography—throwing a net over the Earth' as it was called.

But what amazed the court and all officialdom was Chang Heng's spectacular earthquake detector, or seismograph. 'Nothing like this had ever been heard of since the earliest records began,' was the comment of the official historian for the year 132 AD, speaking of this invention.

At first the court officials could not really believe that Chang Heng's invention could work, even though they had all inspected it and seen it demonstrated. The signal for an earthquake was the falling of a bronze ball into the open mouth of a bronze toad, from the mouth of a bronze dragon above. The official historian describes how the sceptical were converted as follows:

On one occasion one of the dragons let fall a ball from its mouth though no perceptible shock could be felt. All the scholars at the capital were astonished at this strange effect

OPPOSITE (119) A snowflake, photographed through a microscope. The Chinese recognized that snowflakes had six sides, or points, by the second century BC, nearly two thousand years before this was realized in Europe.



occurring without any evidence of an earthquake to cause it. But several days later a messenger arrived bringing news of an earthquake in Lung-Hsi [Kansu, about 400 miles away to the north-west]. Upon this everyone admitted the mysterious power of the instrument. Thenceforward it became the duty of the officials of the Bureau of Astronomy and Calendar to record the directions from which earthquakes came.

What did this extraordinary machine look like, and how did it work? It consisted of a fine cast bronze vessel, rather like a wine-jar, 6 feet across, with a domed lid. The outer surface of the vessel was decorated with motifs of mountains, tortoises, birds, animals and antique writing. All around the vessel was a series of eight dragons' heads, equally spaced,

each holding a bronze ball. The balls would drop out if the dragons' mouths opened, or if pushed into the waiting open mouth of a bronze toad made a little to the side. The device was used to record the direction of earthquakes. The balls had been raised from the side later, it was found, when the mouth of the dragon was closed. Science Museum, London.

holding bronze balls in their mouths. The balls would drop out if the dragons' mouths opened, or if pushed

Round the base of the vessel sat eight corresponding bronze toads, looking upwards with their mouths wide open. They were positioned directly beneath the dragon mouths, ready to catch the falling balls. Obviously, a bronze ball dropping into a bronze toad would make a great deal of noise: people would be alerted by the resounding clang. This principle in itself is an interesting innovation, being a kind of predecessor

of the alarm clock, it may well be that Chang Heng conceived the idea of the dropped ball independently, for the principle had been used earlier in the West. Needham says 'The principle of recording by means of dropping balls was one in which Chang Heng had been anticipated by Heron of Alexandria (fl. 62 AD) who used it in some of his odometers. Needham was unaware, however, of an even earlier tradition in Greece, according to which the falling ball alarm device appears to be an invention of Aristotle. Towards the end of his life Aristotle suffered from either a severe gastric ulcer or stomach cancer. In order to alleviate the terrible pain he would lie in bed with a skin filled with hot oil placed on his stomach—a kind of ancient hot-water bottle. If he drifted off to sleep, though, he would be badly burned. So he devised a system whereby he held a bronze ball in his hand over a bronze bowl, so that if he dozed off he would be awakened immediately by the sound of the ball dropping into the bowl.'

This may be where Heron got the idea, and it is possibly also the origin of Chang Heng's falling-ball arrangement. For this is just the sort of popular tale about a famous man which would have circulated round the ancient world, eventually becoming part of the lore brought to China from the Near East during the three centuries before Chang Heng's time. 'In the

stable period of the Han Dynasty there was considerable trade and travel between East and West.

But how precisely were the balls released, and how could the machine be restricted to dropping only a single ball? The ancient sources are rather vague. Little is said about the workings of the dragon mechanism. The toothed gearwork and the complex construction

of the hidden inside the vessel and the cover fitted down closely all round, without any crevice.

We are also told 'Inside there was a central column capable of lateral displacement along tracks in eight directions, and so arranged that it would operate a closing and opening mechanism. This central column was quite clearly a pendulum of some kind. It would move when there was an earth tremor and release a ball. As soon as the ball was dropped, an inner door of the mechanism took place, preventing secondary earth tremors releasing all the balls and thus ruining the point of the device.'

The account adds 'Now although the mechanism of one dragon was released, the seven other heads did not move and by following the azimuthal direction of the dragon which had been set in motion, one knew the direction from which the earthquake shock had come. When this was verified by the facts there was found an almost marvellous agreement.'



LEFT: A cross-section of the modern model of Chang Heng's seismograph of 132 AD in the Science Museum, London.

inner or apparatus in this version was designed by the Chinese scholar Wang Chen-shi in 1936. The only cultural object in the museum is a pendulum which is imagined as fitting snugly with an earthquake. However,

In later centuries similar instruments were constructed in China using the principles of Chang Heng's machine. The mathematician Hsiao Fan wrote about the machine giving diagrams, three hundred years later, and is presumed to have made one. The same is true of Lin Hsiao-Kung, some time between 581 and 604 AD. But by the time of the Mongol rule in the thirteenth century the principles of the seismograph had been lost. Thus did the Chinese often forget their own achievements.

Several attempts have been made in this century to reconstruct the machine's mechanism. Japanese scientists led by Imamura Akitsune built what is probably the most accurate version at the Seismological Observatory of Tokyo University in the 1930s. It worked as an earthquake detector, but they

found that the ball was usually released not by the initial longitudinal wave, but by secondary transverse waves; though if the first shock was very strong, it would do. In some

circumstances one had to take the direction at right angles to the dropped ball as that of the earthquake's epicentre. Imamura points out that by estimating the direction of the preliminary tremors, and consequently the focal distance, one could give a rough estimate, not only of the direction, but also of the distance, of the earthquake.

Imamura's reconstruction may be seen in the accompanying diagrams, which have been redrawn with slight amendments by the author. An inverted pendulum with a weighted bob near the top is sensitive to earth tremors, and tilts over when it perceives one. A long sharp pin at the top moves along one of the eight channels between two plates, pushing a 'slider'. This 'slider' is in contact with the ball in the dragon's mouth at the end of the channel, and pushes the ball out of the mouth so that it drops (or alternatively, it causes the dragon's mouth open slightly, thus releasing the

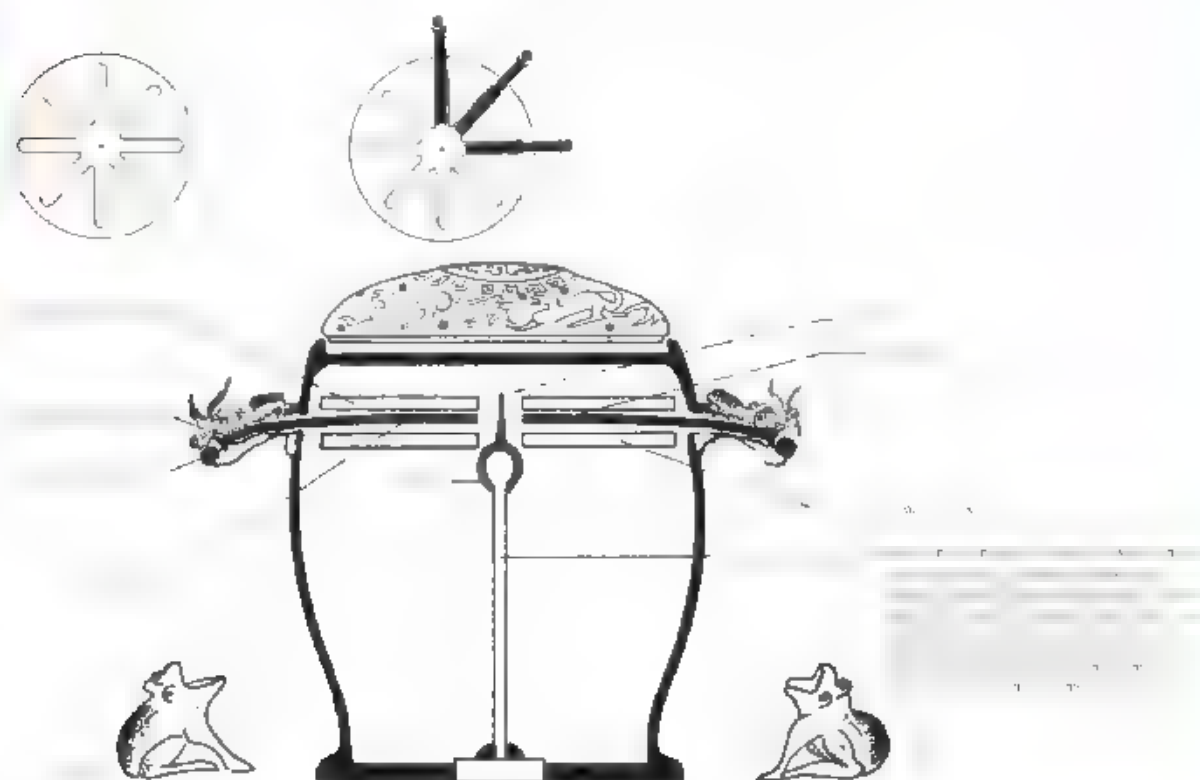


FIGURE 2) The author's own reconstruction of the most likely mechanism of Chang Heng's seismograph, an improved version of Imamura Akitsune's of 1939. Imamura adopted the principle of the inverted weighted bob, shown here, and the pin which entered one of eight channels and pushed sliders, which released the balls. The top view shows the two plates from above with three of the sliders and balls represented. It shows superimposed on the lower one. The side view shows the full apparatus.





A 30W4-23. A modern Chinese seismograph in operation. The current seismologist at Taiwan's Central Weather Bureau points out on a bar an earthquake measuring 5.7 on the Richter Scale, which struck Taipei on June 14, 2001. No one was injured.

ball). The immobilization is simply obtained because the pin is in a channel and would have to slide back first before it could enter another channel. This version seems to offer the most likely explanation of the original mechanism.

The instruments we use today only began their development in 1848. The first modern seismograph of any kind was designed by De la Hautefeuille in 1703, making Chang Heng exactly 1571 years in advance of the West with his ingenious machine.

## SPONTANEOUS COMBUSTION

The Chinese were apparently the first people to become aware of the phenomenon of spontaneous combustion. The earliest surviving account of it in a Chinese text is found in a book which may be called either *Record of the Invention of Things*, or *Record of Strange Things*, depending on how the title is translated. It was written before 290 AD by the statesman, philosopher and poet Chang Hua.

He collected tales of bizarre and supernatural phenomena and studied them in a more or less scientific fashion. His biographer says of him: 'All sorts of rare books and objects whose very existence was thought to be doubtful could have been found in

Hua's household. So huge was his collection and so wide his knowledge of the world, that his erudition was regarded as peerless in his time.'

Many of the phenomena he studied involved 'strange radiances', 'strange phenomena', 'mysterious purple vapour', 'luminous objects', 'five-coloured lights', and resonance puzzles. It is therefore hardly surprising that with such interests, Chang Hua should have preserved the earliest account of spontaneous combustion. Here is the note he made of it, in describing an episode which took place during his own lifetime:

If ten thousand piculs of oil are accumulated in store, the oil will ignite itself spontaneously. The calamitous fire which occurred in the arsenal in the time of the Emperor Wu [of the Chin Dynasty] in the T'ai-Shih reign-period [265-74 AD] was caused by the stored oil.

It took a great deal of perspicacity to recognize and acknowledge the phenomenon of spontaneous combustion since the more usual course often repeated was simply to blame arsonists. In a thirteenth-century Chinese work entitled *Parable, Cases Solided by Eminent Judges* we have an account of how spontaneous combustion was only with difficulty accepted as the explanation for a disastrous fire, which had occurred in about 1050, and the lives of those who had been thought responsible were thereby saved.

When the Director of the Sacrifices Department of the Ministry of Rites, Ch'iang Chih, was serving as Incendant of the Imperial Guards at the palace of K'afeng, oiled curtains had been left piled up in the open air, and one night they caught fire. According to the law the men responsible for looking after them all incurred the penalty of death. But at the preliminary hearing of the case, Ch'iang Chih conceived doubts about the cause of the fire, so he summoned the workmen who had made the curtains and questioned them. These artisans said that during the manufacture of the curtains a certain chemical was added to the oil, and that if they were left for a long time piled up, then on getting damp they might start burning. When Ch'iang Chih reported this to the Emperor Jen Tsung [reigned 1023-63] the Emperor was suddenly struck with an idea and said, 'The fire which recently occurred in the mausoleum of

the Emperor Chen Tsung [died 1022] started in oil garments. So that was the cause" The guards were set off with a lighter punishment.

The author of this refers to the previous account by the Chinese scholar Wang Hsien-ch'ang of the fire which occurred formerly during the Western Han period. The Chinese scholar also mentions that the fire occurred in the Han period, and that the fire was caused by the burning of oil.

The author also mentions that the fire was caused by the burning of oil, which would seem to suit the description and which could have had the effect described is quicklime, which is a good whitenng agent. It is also interesting, he notes, that oil and quicklime were once thought to be the recipe for 'Greek fire', a liquid which the Byzantines used to burn the enemy, which is now known to have been petroleum.

The first Western account of the use of oil in combustion was apparently by JPF Duhamel, in a

paper published in 1757. He says that the Chinese used to burn oil with a fire that would burn for only a few hours. We now know that dried cloths must never be stacked up and stored, as they will spontaneously ignite. The navy storekeepers in the 18th century were aware of this, and used to burn the oil in a large tank, and the result was a gigantic conflagration.

## 'MODERN' GEOLOGY

James Hutton (1726-97) was the father of modern geology. In 1785 he published his *Theory of the Earth* in which the principles of modern geology were

laid out for the first time.

In the West. Because his writings were difficult, his work received little attention until a more lively summary

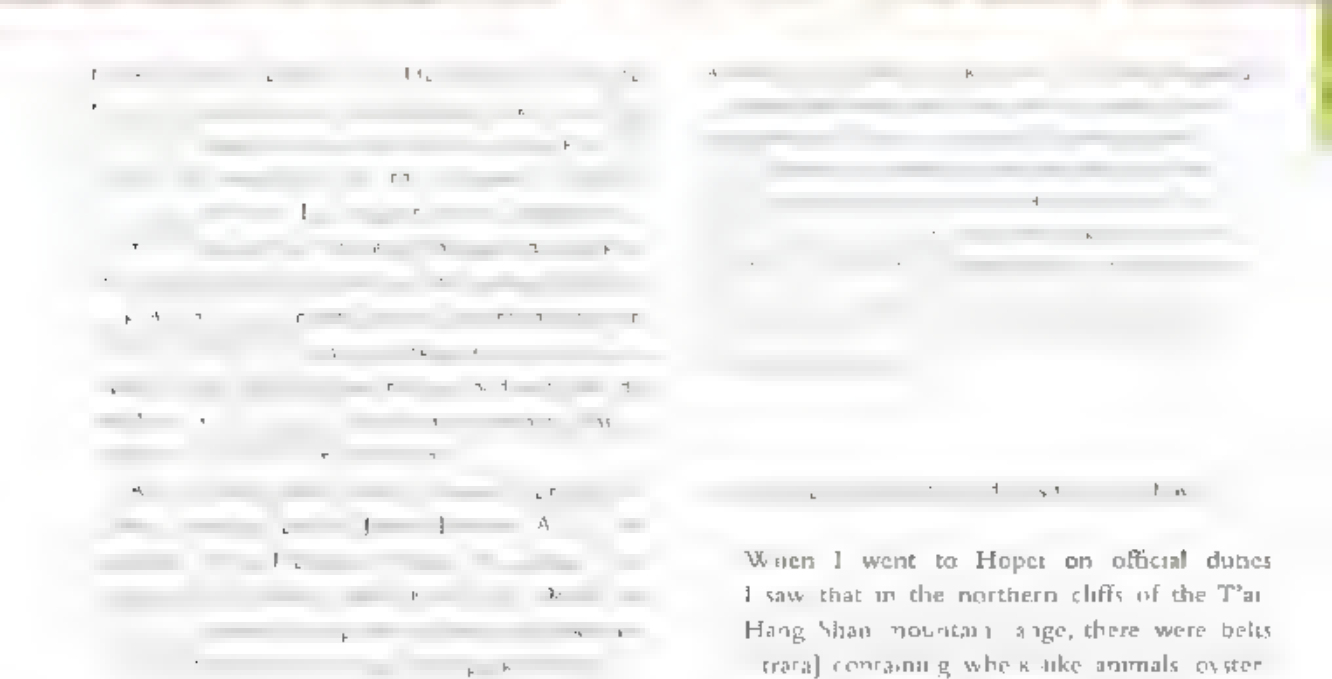
it was published in 1837. This was his *Illustrations of the History of the Earth*.

It may seem strange that

Hutton. Europeans did not understand what we today



the first of the great geologists. Hutton was a Scottish geologist and naturalist. He was born in 1726 and died in 1797. He was a member of the Royal Society and the Royal Academy of Sciences. He was also a member of the Edinburgh Philosophical Society. He was a pioneer in the study of geology and is considered the father of modern geology. He was also a pioneer in the study of natural history and is considered the father of modern natural history. He was also a pioneer in the study of the history of the Earth and is considered the father of modern history of the Earth.



are precipitous abrupt sharp and strange  
 considering the reasons for these shapes  
 I think that (for centuries) the mountain  
 torrents have rushed down carrying away all  
 and all and thus leaving the hard rock  
 standing alone

When I went to Hoper on official duties  
 I saw that in the northern cliffs of the Tai  
 Hang Shan mountain range, there were belts  
 (trava) containing whale like animals oyster  
 shells and stones like the shells of birds eggs  
 [fossil cetinoids] So this place though now  
 a thousand li west of the sea, must once  
 have been a shore Thus what we call the  
 continent must have been made of mud  
 and sediment which was once below the  
 water the Yu Mountain when Yao ruled

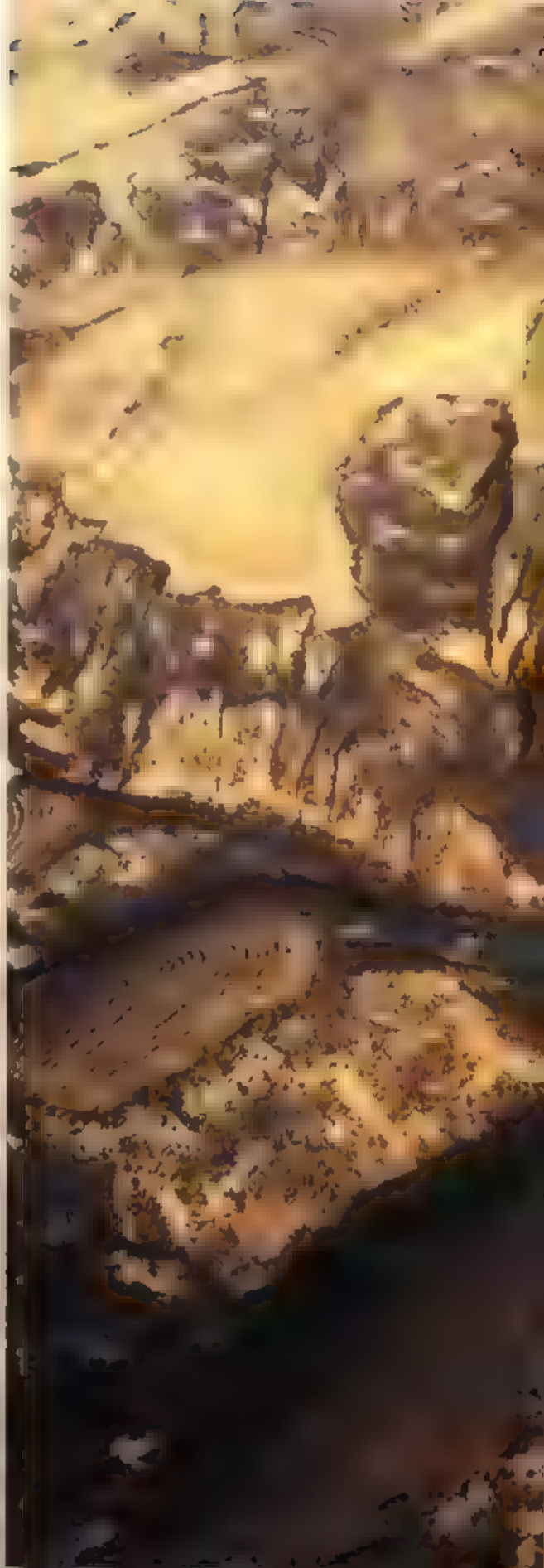
Kun, was according to ancient tradition, by the side of the Eastern Sea, but it is now far inland.

Now the Yellow River, the Chang Shui, the Hu T'o, the Cho Shui, and the Sang Ch'ien are all muddy, silt-bearing rivers. In the west of Shensi and Shansi the waters run through the gorges as deep as a hundred feet. Naturally mud and silt will be carried eastwards by these streams year after year, and in this way the substance of the whole continent must have been laid down. These principles must certainly be true.

Shen Kua did not originate all these ideas but he expounded them well and combined them with his own personal observations in the field. The concepts of the seabed's having been lifted up over the course of ages to become mountains went back centuries before Shen Kua's time in China. It seems to have developed under the influence of the Buddhists, who came from India. Since the Buddhists believed that the world was often destroyed and recreated, the Chinese took this notion and combined it with their observations of sea shells on mountain tops to envisage cataclysmic geological changes. The key Chinese concept was of the *ch'ing-t'ung* 'empty, void'. This was the quaint phrase used to describe patches of dry land in the mountains which had once been under the sea. We find this phrase used by the alchemist Ko Hung about 320 AD in his book *Lives of the Divine Hsien*. (A *hsien* is a man who has become an immortal.) Ko Hung wrote of the legendary immortal Ma Ku and had her say:

Since I was last invited here I have seen the Eastern Sea has turned into mulberry groves. This change has occurred three times. The last time I arrived at Mount P'eng-Lai [for an assembly of *hsien* immortals] I noticed that the sea was only half as deep as it had been at the

RIGHT 126. An aerial photograph taken in the province of Shensi showing the drastic soil erosion in that area of loess soil. The Chinese were the first to appreciate the important part played by erosion in shaping the Earth's surface. As Shen Kua wrote in 1086: 'I think that for centuries the mountain torrents have hurried down, carrying away all mud and earth, thus leaving the hard rocks standing alone.'







previous meeting. It looks as if the sea will again be turned to mountains and dry land.

Fang Ping laughed and said, 'The sages all maintained that where the sea is now the dust will one day be flying.

If in 320 A.D. an author could say that the seas will 'maintain' this, then the tradition must be far more ancient. There is a reference to the idea in the official history of the Chin Dynasty where Tu Yu (222-84 A.D.) is described

Tu Yu often used to say that the high hills will become valleys and the deep valleys will become hills. So when he made monumental steles recording his successes he made them in duplicate. One was buried at the bottom of a mountain, and the other was placed on top. He considered that in subsequent centuries they would be likely to exchange their positions.

These concepts were a continuous part of Chinese literary, historical and philosophical tradition. The famous Neo-Confucian philosopher Chu Hsi (1130-1200 A.D.) wrote:

The waves roar and rock the world boundlessly, the frontiers of sea and land are always changing and moving, mountains suddenly arise and rivers are sunk and drowned. Human things become utterly extinguished and ancient traces entirely disappear, this is called the 'Great Waste-Land of the Generations'. I have seen on high mountains conchs and oyster shells, often embedded in the rocks. These rocks in ancient times were earth or mud, and the conchs and oysters lived in water. Subsequently everything that was at the bottom came to be at the top, and what was originally soft became solid and hard. One should meditate deeply on such matters, for these facts can be verified.

## PHOSPHORESCENT PAINT

The Chinese have been fascinated by natural luminescence since the earliest times. Fireflies appear in one of the oldest surviving texts, the *Book*

*I Ching*, which dates from at least the early centuries of the first millennium B.C. 'Fishing go the night travellers', says an old folk song in this work. A traditional story is preserved in an early official history of the impoverished but diligent student Hsue Yi, who died about 357 A.D. His family was too poor to buy oil for his lamp, so he collected a bagful of fireflies each evening and read

The connection between the bioluminescence of fireflies and the glowing of certain kinds of rotting vegetation was certainly made by the Chinese. By the seventh century B.C. a book entitled the *Ministry Ordinances of the Chin Dynasty* provided the somewhat garbled observation that 'decaying grass becomes fireflies'. Luminescence was recognized as being common to the two, and perhaps at this period the Chinese actually thought that fireflies were engendered in this way. But the luminescence of decaying vegetation was clearly recognized in its own right as we see from a book of the second century A.D. which states that 'old pieces of *Sapindi* wood shine at night' and the official history for 466 A.D. which tells us. In the time of the Emperor Mu (424-490 A.D.) Tao Sheng, Taoist priest from a mountain temple, reported that a pit in an apartment next to the Hall of Salvation was spontaneously shining brightly in the dark. Thus wood had lost its natural properties. Some people said that when wood goes rotten it shines of itself.

A clear understanding of these phenomena was somewhat impeded and complicated by numerous accounts of marsh fires. These may be caused by burning methane gas (though even today we are not certain what causes 'marsh gas'). The statesman and poet Chang Hsiang described in his *Record Strange Things* (290 A.D.) both wild-o'-the-wisp and static electricity.

These lights stick to the ground and to shrubs and trees like dew. As a rule they are invisible, but wayfarers come into contact with them sometimes, then they cling to their bodies and become luminous. When wiped away with the hand, they divide into innumerable other lights, giving out a soft crackling noise, as of peas being roasted. If the person stands still a good while, they disappear, but he may then suddenly become bewildered as if he had lost his reason and not recover before the next day.



Nowadays it happens that when people are combing their hair, or when dressing or undressing, such lights follow the comb, or appear at the buttons when they are done up or undone, accompanied likewise by a rackling sound.

Chien Hao, a famous collector of curios, once paid 50,000 mace [coins] to a barbarian merchant for a stuffed bird's head, very brightly coloured, which he used as a pillow. He also got hold of an extraordinary painting which he presented to Li Hour Chu [the third and last Emperor of the Southern T'ang Dynasty, this can be

dated to 977 AD]. This ruler upon the extinction of the Southern T'ang passed it on as tribute to the second Sung Emperor, T'ai Tsung. T'ai Tsung hung it up in the back garden of the palace in order to show it to the court. On the painting there was an ox which during the day appeared to be eating grass outside a pen, but at night seemed to be lying down inside it. None of the officials could offer any explanation for this phenomenon. Only the monk Tsan-Ning, however, said that he understood it. [He] said that it would be found in a book called the *Hai Wen I Ching* written by Chang Chien [a famous envoy of the second century BC]. Afterwards Tu Hao examined the collections in the Imperial library, and found the reference in a manuscript dating from the Liu Ch'ao period [third to sixth centuries AD].

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# Part 9

## TRANSPORTATION AND EXPLORATION

THE KITE

LU KYU-IL

The kite, an early means of escape for the Chinese, was first mentioned in the *Sung-shih* (1143), which records that the late 11th-century Chinese scholar Shen Kuo (1031-1095) was the first to describe the kite in his *Pen-ching* (1088). However, it was not until the 13th century that the kite was used for the purpose of escape. In the 13th century, the Chinese were forced to flee their homes in the face of the Mongol invasions. The kite was used to carry messages and to escape. In the 13th century, the Chinese were forced to flee their homes in the face of the Mongol invasions. The kite was used to carry messages and to escape. In the 13th century, the Chinese were forced to flee their homes in the face of the Mongol invasions. The kite was used to carry messages and to escape.

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The Chinese were always most ingenious in their use of kites. They developed a technique of using them for fishing. The hook and bait would be attached to a kite and flown from a boat on a wide river or a lake and would come to rest at some distance sufficient y far from the boat's shadow to deceive even the canniest of fishes.

The variety of kites in China is extraordinary. Apart from the traditional bird shape there are kites in the forms of centipedes, frogs, butterflies, dragons and hundreds of other creatures, both real and imaginary. Some have rolling eyes or moving paws and tails.

Musical kites seem to have existed in China since the seventh or eighth century. They make whistling, moaning or harp-like sounds. A kite fixed with a single bamboo strip is a 'wind psalter', or a 'wind zither'. A kite with seven strings fixed across a gourd-shaped framework is called a 'hawk lute'. Such Aeolian harps and whistles are not peculiar to kites. Whistles are also often put into the tails of pigeons.

The use of kites in China was intimately connected with a concept of what Needham translates into English as the 'hard wind'. This idea of the Taoist philosophical school partly derived from the early shaman traditions, where mystical journeys through the air were experienced either in trance or with the aid of drugs. In the early *Lieh Tzu* book, parts of which date from the fifth century BC, we read that 'Lieh Tzu could ride upon the wind. Cool and skilfully sailing, he would go on for fifteen days before returning'.

Kite flying seems to have been a kind of meditative exercise for the early Taoists, and had a similar significance to that which archery had to the later Zen Buddhists. One may imagine an early Taoist meditating upon the Way of the Universe as he flew his kite. His reveries are combined with an intimate contact with the actual aerial phenomenon of the wind and the need to keep a tiring the tension of the string and compensating for wind changes. The sage might regard this as an analogy for 'following the Way', which was also often compared to 'following the grain of the Universe', with the grain of wood as the analogy.

The subtle variations in air currents with which the sage would have developed familiarity would have been associated with his reveries and the 'imaginary flights' of his mind. We can thus understand how Lieh Tzu is described as depending upon the wind when

he 'rides upon it' in his fancy. But there is the further possibility that the Taoists are referring at this early date to man-lifting kites.

In one of the two greatest classics of Taoism, the book called *Chuang Tzu* ('The Book of Master Chuang'), which dates from about 290 BC, we read of more soaring into the air and are given some opinions about the nature of air and how it bears things up.

In the Northern Ocean there is a fish, by the name of *k'ui*, which is many thousand *li* in size. This fish metamorphoses into a bird by the name of *p'eng*, whose back is many thousand *li* in breadth. When the bird rouses itself and flies, its wings obscure the sky like clouds. . . it flaps along the water for three thousand *li*. Then it ascends on a whirlwind up to a height of ninety thousand *li*, for a flight of six months' duration. . . Without sufficient density, the wind would not be able to support the large wings. Therefore when the *p'eng* had ascended to ninety thousand *li*, the wind is all beneath it. Then . . . no obstacle ahead of it, it mounts upon the wind and starts for the south.

This is the very bizarre myth with which the *Chuang Tzu* opens. The concept of air density is literally expressed as 'thickness of condensation'. Burton Watson, in his translation of the *Chuang Tzu*, renders it 'piled up deep enough'. The early Taoists were much preoccupied with the actual nature of air and wind, and they formulated a concept of the 'hard wind' to express the aerial capacity to lift a kite. It was in fact the pressure exerted by a moving airstream on the underside of an airfoil.

The Chinese did develop cambered wing kites, with surfaces like wings, curved upwards at the top and either concave or flat underneath. But we cannot fix any date for this. We do not know whether or not the early Western designers of aircraft, such as Sir George Cayley in the nineteenth century, knew of Chinese cambered kites. But the chief influence of the kite on aviation was the invention in 1893 of the box kite by the Australian Lawrence Hargrave. Box kites were copied by bi-plane builders later. And until 1911, books on aviation generally began with introductory chapters on kites because of these origins. Early aviators even tended to use the slang term 'kites' to refer to their aircraft at the

beginning of this century. Such was the heritage the kite with which the Chinese had flown two thousand years before the European.

## MANNED FLIGHT WITH KITES

The earliest specific description which gave physical details of manned flight with kites occurs in historical accounts of the short lived and obscure Northern Ch'i Dynasty. This dynasty existed for only 27 years between 550 and 577 A.D. The incidents described here occurred at the end of a century of disintegration preceding the third unification of China and the start of what is generally thought of as its Golden Age; at this time Europe was still in the throes of the Dark Ages.

Illustration of a man flying a kite in China



Yang, who reigned from 540 to 559, carried out a systematic extermination of the entire Yuan family (whose original surname was T'opa, which because it was not Chinese they changed to Yuan to facilitate social assimilation), who had controlled the previous Wei Dynasty. In the first year of his reign alone, no less than 771 members of the family were massacred on his orders. Many of these murders were carried out with a sinister ingenuity.

Having embraced Buddhism, the Emperor Kao Yang went to receive his ordination at the Tower of the Golden Phoenix, north-west of the capital city of Yeh near modern Lin-chang, north of the Yellow River. In the ancient Chinese exercise of piety called the liberation of living creatures, fish and birds were released after they had been caught. The Buddhists took on this practice believing that it conferred merit on a pious man. In a typical example of the perverse and insane behavior of one of China's most

Illustration of a man flying a kite in China



ABOVE: (Top) An illustration of a man flying a kite in China. (Bottom) A photograph of a man flying a kite in England, 1805, carrying a paper lantern. (Right) A photograph of a man flying a kite in France, 1805. (Bottom right) A photograph of a man flying a kite in France, 1805.

'the liberation of living creatures' but his version of it was somewhat different.

The creatures he decided to liberate were his enemies, the Topa and Yuan armies, and his method was to throw them from the top of the 144-foot tower. As the official history tells us: 'He caused many prisoners condemned to death to be brought forward, had them harnessed with great bamboo mats as wings and ordered them to fly to the ground from the top of the tower. This was called a liberation of living creatures. We are also told that 'All the prisoners died, but the Emperor contemplated the spectacle with enjoyment and much laughter'.

This Emperor's aerodynamic fantasies then underwent a further development and he became determined to carry his amusing experiments to more exciting lengths. By 559, the last year of his reign, he was regularly using condemned prisoners to jump from the Tower of the Golden Phoenix as test pilots for man flying kites. Needham comments: 'The circumstances show that what was going on was not quite simply a cruel emperor's sport with prisoners for the cables of the kites must have required man-handling on the ground with considerable skill and with the intention of keeping the kites flying as long and as far as possible. One prince of the Wei, a prominent member of the Yuan family, was asked to

make a very successful flight, or what seems to have been about two miles. The incident is described in a history of the period called the *Comprehensive Mirror of History for Aid in Government*, which was compiled from official documents of the time.

Kao Yang made Yuan Huang-T'ou and other prisoners take off from the Tower of the Golden Phoenix attached to paper kites in the form of owls. Yuan Huang-T'ou was the only one who succeeded in flying as far as the Purple Way, and there he came to earth. But then he was handed over to the President of the Censorate, Pi I-Yun, who had him starved to death.

The famous Taoist author Ko Hung (283-343 A.D.) is called by Needham 'the greatest alchemist of his age and the greatest Chinese alchemical writer of any age'. Ko Hung was an all-round scientist who discussed natural phenomena of all kinds and he greatly concerned himself with astronomy and geology. He had a love of the exotic and the strange and repeatedly emphasized that conventional ideas about nature were inadequate. When young he had achieved prominence and fame as a soldier suppressing the rebellions of 313 A.D. Many years later he was given the title of Marquis, for these early services to



A flying machine made by the Chinese. Since we have plenty of wind, it is not surprising that they have resorted to such a device.

the sea. But he pointed proudly with the bamboo pole to the person in the flying device. He was clearly very content with his day.

Needham wrote of Ko Hung: His words about the series of different kinds of machines could be interpreted harshly. Few of us know well the principle of his explanation of making kites in the shapes of animals. I have to do better than what he was referring to with regard to flying kites. Here is the passage about man-made flight in the fourth century, in which Ko Hung is referred to as the Master.

Someone asked the Master about the principles of mounting to dangerous heights and travelling into the vast void. The Master said: Some have made flying cars with wood from the inner

part of the yucca tree, using ox leather straps fastened to returning blades so as to set the machine in motion. Others have had the idea of making five snakes, six dragons, and three oxen to meet the "hard wind" and ride on it, not stopping until they have risen to a height of forty *chi* [about 65, 100 feet]. That region is called the Purest of Empty Space. There the *chi* [emanation of the sky, or perhaps wind] is extremely hard, so much so that it can overcome the strength of human beings. As the teacher [we do not know who is meant by Ko Hung here but perhaps he refers to the Taoist sage known as Chuang Tzu] says: "The kite [bird] flies higher and higher spirally, and then only needs to stretch its two wings, beating the air



no more, in order to go forward by itself. This is because it starts gliding on the 'hard wind'. Take dragons, for example, when they first rise they go up using the clouds as steps, and after they have attained a height of forty *li* then they rush forward effortlessly, gliding." This account comes from the adepts and is handed down to ordinary people, but they are not likely to understand it.'

As Needham says: 'For the beginning of the fourth century AD this is truly an astonishing passage. There can be no doubt that the first plan which Ko Hung proposes for flight is the helicopter: top returning (or revolving) blades can hardly mean anything else, especially in close association with a belt or strap.'

On the rest of the passage Needham goes on to say:

I have no doubt that what he was referring to were man-lifting kites, and though as yet we have no evidence that Ko Hung or any of his contemporaries constructed such large instruments, there would have been really nothing to prevent it. For people expert in kite-flying the possibility was obvious. Lastly, what is to be said of Ko Hung's 'hard wind'? From the examples he gives of the gliding and soaring of birds, it is obviously nothing else than the property of 'air-lift', the beating or rising of the inclined aerofoil subjected to the forces of an airstream, whether natural or artificial. Ko Hung applies the concept very clearly to gliding flight, as indeed had Chuang Chou [Chuang Tzu] before him, when he wrote [in the fourth century BC] about the wings of the giant *p'eng* bird being airborne upon the density of the wind beneath. Ko Hung ends by attributing to him the idea that flying things rise up 'using the clouds as steps', which may be more than a poetic metaphor, hinting as it does at the existence of those ascending air-currents which modern glider pilots have learnt so well to utilize. Something of these could probably have been observed in the behaviour of smoke, and particularly of the mists and clouds on the lofty mountain heights which the Taoists delighted to frequent.

The Taoists had been taking refuge in obscure mountain sanctuaries for centuries. There they passed on their traditions orally from master to pupil, leaving much of the more esoteric lore unwritten. Kite flying, and flying with the aid of kites, was not only suited to the high and windy locations where these early adepts of aviation lived, but was most probably a pursuit viewed as immensely important, and carried out in great secrecy. A sage would be no more inclined to impart the secrets of how he was imitating the birds and learning how to ascend bodily to heaven, than he would be likely to explain to the man in the street how to make an elixir of immortality, or how to make 'gold' in a secret cave laboratory. By virtue of these pursuits the Taoists are now thought to be the true proto-scientists of early China.

By the thirteenth century, man-lifting kites were widely used throughout China. A dramatic account of the practice was given by Marco Polo in a version of his book called the *Zi* Manuscript:

And so we will tell you how when any ship must go on a voyage, they prove whether her business will go well or ill. The men of the ship will have a hurdle, that is a grating, of withies [willow stems], and at each corner and side of this framework will be tied a cord, so that there be eight cords, and they will all be tied at the other end of a long rope. Next they will find some fool or drunkard and they will bind him on the hurdle, since no one in his right mind or with his wits about him would expose himself to that peril. And thus is done when a strong wind prevails. Then the framework being set up opposite the wind, the wind lifts it and carries it up into the sky, while the men hold on by the long rope. And if while it is in the air the hurdle leans towards the way of the wind, they pull the rope to them a little so that it is set again upright, after which they let out some more rope and it rises higher. And if again it tips, once more they pull in the rope until the frame is upright and climbing, and then they yield rope again, so that in this manner it would rise so high that it could not be seen, if only the rope were long enough. The augury they interpret thus, if the hurdle going straight up makes for the sky, they say that the ship for which the test has been made will have a

quick and prosperous voyage... But if the hurdle has not been able to go up, no merchant will be willing to enter the ship

This must surely be one of the strangest forms of divination or fortune-telling in history

In modern times, men have flown in kites. Since Pocock's attempts in 1895, many more have been made in Europe. B.F.S. Baden-Powell was the first European to achieve full success with man-flying kites in 1894. Therefore, if we take Yuan's successful flight in 559 AD as the first in the world from the point of view of historical record, we have a gap of 1335 years between the Chinese precedent and Europe's first flight.

Nowadays, the widespread use of hang-gliders by ordinary members of the public makes early Chinese manned flight in kites more credible than it would

have been even a few decades ago. Skilled hang-glider pilots understand the nature of the air currents referred to by Ko Hung, and know how to use an ascending current of hot air to rise to over 2000 feet, simply by spiraling up with it. This is, in other words, 'using the clouds as steps' and 'flying higher and higher spirally', as described by Ko Hung, even if his figure of 65,000 feet must be a gross exaggeration. It would appear that the early Taoists did achieve dramatic success in manned kite-flying long before Ko Hung – rising to at least 2,000 feet – and probably over two thousand years ago. But even if we take the generation before Ko Hung as a conservative estimate for the date of the first attempt, we must still acknowledge the existence of manned flight with kites as having been no later than 250 AD – or well over seventeen hundred years ago.

## THE FIRST RELIEF MAPS

The Chinese were the first to use relief maps where the contours of the terrain were represented in models. Relief maps in China go back at least to the third century BC. In the great historical classic, the *Shih Chi* (*Historical Records*) of Ssuma Ch'ien (90 BC), there is preserved an account of probably the most famous relief map ever made. It was built in 210 BC for the tomb of the unifier of China, the megalomaniac emperor Chin Shih Huang Ti, and showed his conquests and empire. The history says:

In the tomb-chamber the hundred water-courses, the Yangtze River and the Yellow River, together with the great sea, were all imitated by means of flowing mercury, and there were machines which made it flow and circulate. Above [on the ceiling] the celestial bodies were all represented, below [presumably on the floor or on some kind of table] the geography of the earth was depicted.

In the mid-1980s, the tomb of this emperor was located, but it has not yet been opened and its investigation has been postponed for some time. Traces of mercury have been found in the soil around what is thought to be the entrance. Archeologists have already suggested that this is the



ABOVE 31 A bronze incense-burner of the fourth or third century BC representing the mysterious mountain paradise of P'eng Lai, which the Chinese believed existed on the far side of the Pacific. It was customary to represent P'eng Lai in this way, with three-dimensional peaks and contours, often inlaid with precious or semi-precious stones. Such centers were a powerful influence in the development of relief maps during the third century BC. The earliest relief map in Europe dates from 1510 (Freer Gallery of Art, Smithsonian Institution, Washington D.C.)



(LEFT) (132) Relief map of the *Shan Shui Wen Sheng* (Shan Shui Wen Sheng) like the one on the left. This is the representation of the second (132) *Shan Shui Wen Sheng* (Shan Shui Wen Sheng) in a seventeenth-century edition. It is a much older book. Map of *Shan Shui Wen Sheng* (Shan Shui Wen Sheng) for comparison. It is a modern edition.

very enormous which circulated in the relief map described above. If this be so we may be on the verge of one of the most amazing archaeological discoveries ever made, for the ancient relief map will presumably still be largely intact. The descriptions which survive state that it was carved out of gold such by the labour of 700,000 workers. It was therefore absolutely enormous. Automatically triggered crashdowns were set up to fire at invaders, and if the strings have survived these would still be in working order.

The Chinese had an ancient and persistent legend about an island paradise, named P'eng-Lai, in the Eastern Sea (that is, the Pacific). It was said to be an island of paper and a house upon earth, frequented only by the immortal immortals who, on drinking elixirs of life, had rejuvenated their bodies, become 'fathered', and were able to pass into the sky. Expeditions were sometimes sent to P'eng-Lai, and at least one full-scale naval task force went in search of the paradise but failed to return. We may never know for certain what this P'eng-Lai originally perhaps P'eng-Lai was Tahiti, or Hawaii, or even America, but it was often depicted in relief on Han Dynasty pots and vessels, dating from the first century BC. One such 'relief map' jar was seen in Paris (191 page 125). These jars had a powerful influence on developing relief map techniques.

A sharp point survives of ancient relief maps made by the general Ma Yuan in 32 AD. The valleys and mountains were represented by modeling in rice. Such military relief maps were so useful that Chiang Kiang wrote a special book entirely on the subject, entitled *Shan Shui Wen Sheng* (Shan Shui Wen Sheng) (c. 842).

Relief maps were discovered in wood. This led to what appears to be the invention of the jigsaw puzzle. We have this description of a 'Jigsaw Map' in the official history of the Liang Dynasty:

Li Shih Chuan (421-66) made a wooden map 18 feet square, on which mountains, rivers, courses and the configuration of the earth were all well shown. When one separated the parts of the map then all the districts were divided and the provinces isolated; when one put them together again, the whole empire then once more formed a unity.

The great scholar, Shao Kuo, wrote the following interesting account in his book, *Shan Shui Wen Sheng* (Shan Shui Wen Sheng) of 1086:

When I went to a government official to inspect the frontier, I made for the first time



a wooden map upon which I represented the mountains, rivers and roads. After having explored personally the mountains and rivers [of the region], I mixed sawdust with wheatflour paste [modelling it] to represent the configuration of the terrain upon a kind of wooden base. But afterwards when the weather grew cold, the sawdust and paste froze and was no longer usable, so I employed melted wax instead. The choice of these materials was dictated by the necessity of making something light which would not be difficult to transport. When I got back to my office [in the capital] I caused [the relief map] to be carved in wood, and then presented it to the emperor. The emperor invited all the high officials to come and see it, and later gave orders that similar wooden maps should be prepared by all prefects of frontier regions. These were sent up to the capital and conserved in the imperial archives.

A wooden relief map was also made by Huang Shang in 1130, which later attracted the attention of one of China's greatest Confucian philosophers, Chu Hsi, who was born in that year and died in 1200. He attempted to find the relief map so that he could study it and made his own ones, using clay as well as wood. The quaintly named book *Jade Dew from the Forest of Cranes* preserves this description of one of his maps.

Chu Hsi also made a wooden map of the countries of the Chinese and Barbarians, upon which the convexities and concavities of mountains and rivers were carved. Eight pieces of wood were used, with hinges to connect them together. The map could be folded and one person could carry it. Whenever he travelled, he took this along with him. But it was never really completed.

It is quite likely that the idea of making relief maps was transmitted to the Arabs from the Chinese, and thence eventually to Europe. The earliest certain relief map in Europe was made in 1510 by Paul Dox, showing the neighborhood of Kufstein in Austria. The Arab Ibn Battutah (1304-77) gave an account of a relief or raised map which he saw at Gibraltar. Nothing earlier than this is known outside China.

## THE FIRST CONTOUR TRANSPORT CANAL

THE HONG KONG RIVER

The Chinese built the world's first contour transport canal (that is, exploiting and following the contour of the land as a way around or over hills) in the third century BC. There is no question that the Chinese were the greatest civil hydraulic engineers in history until modern times. A few facts about the Grand Canal, that gigantic artery for transport by barge, are sufficient to make the point. The Grand Canal was built over many centuries. It extends nearly 10 degrees of latitude on the globe, attaining a length of nearly 1100 miles, and achieves a summit height of 138 feet above sea level. A good way to envisage it is to imagine a broad canal extending from London to Tangiers or from New York to Florida. This great engineering feat was complete by the year 1327.

Nothing remotely approaching the Chinese canal systems existed in Europe until the four great seventeenth-century canals in France, the last of which was not finished until 1775. But none of these



ABOVE: 133. The headworks of the Magic Canal. North is in the top left-hand corner. The waters of the Hsiang River flow in from the right, and meet the 'Spade Snout' which divides the waters into two channels. The 'Spade Snout' is flanked on either side by large spillways, to drain away some of the water and reduce the force of the current. The Hsiang continues along the northwards course and the Magic Canal commences with the channel running along the bottom of the diagram. Massive embankments and walls of dressed stone form the length of the canal. Further spillways keep the water level under control. The canal is 5 feet wide and the water is 3 feet deep. The canal's length is just over 26 miles. It links two rivers flowing in opposite directions, thus making possible continuous inland navigation for a distance of 1250 miles, from the latitude of Peking to Canton. This canal was thus a major economic and military development for China, foreshadowing the later Grand Canal which runs for nearly 1100 miles.

was longer than 150 miles. There were only 630 miles of canals in all France by the end of the eighteenth century, and even by 1893 the total mileage of French canals had only reached three times the length of China's Grand Canal alone in 1300. The Grand Canal is between 10 and 30 feet deep and often 100 feet broad, whereas the early nineteenth-century canals of England were only 5 feet deep and 45 feet broad. Needham estimates that 'the canals of all Europe probably still fall short of the Chinese artificial navigable waterways in mileage.

There is no doubt that the ancient Babylonians were highly advanced in irrigation canals, but we are uncertain to what extent they had progressed in transport canals, sluice gates, and so on. Evidence for the use of sluice-gates by the Phoenicians goes back to the second millennium BC in the harbour at Sidon. As regards non-Babylonian canals, an Egyptian canal connecting the Nile with the Red Sea was commenced by Necho (610-595 BC), but was only completed under Ptolemy Philadelphus about 280 BC. There was a shipway across the Isthmus of Corinth by the early sixth century BC, which remained in use until the ninth century AD; it was not a canal, and ships were pulled on slipways at either end and carried on wheeled cradles along a masonry road for most of the length. Ancient Egyptian waterworks connected with the Nile were seasonal and intended to help with both irrigation and silt deposition, rather than to act as transport arteries.

The greatest canal of Middle Eastern antiquity was apparently the Nahrawan Canal of about the third century AD, which ran for about 250 miles with an impressive breadth of 400 feet, emanating from and then rejoining the Tigris river. The Babylonian area had much earlier seen vast networks of irrigation canals radiating outwards from the rivers attempting to ensure perennial water supply and to transform the river valleys into artificial deltas. There may have been canals built specifically for transport, but they would not have been contour ones: rather glorified irrigation canals in a flat landscape. We must also not ignore

India and must acknowledge that Nandivardhana constructed a transport waterway in the fifth century BC. Unfortunately, the history of these ancient non-Chinese constructions is still buried in considerable obscurity because of the lack of surviving evidence.

In China, the Hang Kow transport canal is thought to have been the first to be constructed. It was apparently built in the sixth century BC. However, what is of particular interest to us is the world's first contour transport canal, of the third century BC, the Magic Canal (Ling Ch'u). This was indeed a most impressive pioneering achievement. It was constructed by the engineer Shih Lu on the orders of the Emperor Ch'in Shih Huang Ti, the tyrannical and superstitious monster who first unified China. The impetus for this innovative type of canal was to assist in supplying the emperor's armies sent south in 219 BC to conquer the people of Yueh. We are told by the great historian Ssuma-Ch'ien that

[the emperor] sent the Commanders (Chao) T'o and T'u Chu to lead forces of fighting-men on boats with deck-castles to the south to conquer the countries of the hundred tribes of Yüeh. He also ordered the Superintendent (Shih) Lu to cut a canal so that supplies of grain could be sent forward far into the region of Yüeh.

The Magic Canal, which is still used today, is just over 200 miles long. Its chief interest is thus not its length, which is unexceptional. The construction of the Magic Canal, linking as it did two rivers flowing in opposite directions, made possible the continuous



RIGHT 134 A view of the Magic Canal, perhaps in the neighbourhood of Ningbo.



inland navigation of barge transport for a distance of 1250 miles in a direct line from the fortieth to the twenty-second parallel. One could thus sail inland from the latitude of Peking in the north as far as Canton and the sea to which is today Hong Kong. The Magic Canal was the final link in the chain.

The problem that had to be overcome was that the River Hsiang, with its source at Mount Hsiangshan, flowed northwards, while the nearby River Li flowed southward. 'If only one could get a boat from one to the other' for the Hsiang led eventually to the Yangtze and the Li joined a tributary of the West River and led to Canton. Near the little village of Hsing-an, the Hsiang and the Li in a landscape of limestone hills are only three miles apart. Simply joining them was not sufficient. Another solution had to be found.

There was a saddle in the hills at this point along which a canal could be dug. The rivers themselves were unruly and a lateral transport canal had to be dug alongside the Hsiang river for 1½ miles at a more even gradient than the river itself had. At the other end, 17 miles of the Li river had to be canalized in order to regulate it and make navigation possible. Only with the two rivers 'tamed' at either end like this could a 3-mile canal then be dug to join them. A mound shaped like a snout was constructed in the middle of the swiftly running Hsiang to divide its flow and lead off much of the rushing water. It was backed up by two spillways, and further spillways were made lower down. Several bridges at Hsing-an were constructed to cross the canal, which was 3 feet deep and 15 feet wide. The system of division of the waters and spillways resulted in only

about three-tenths of the water from the Hsiang entering the connecting canal so that it was not overwhelmed.

By being built along the contours of the saddle in the hills, the canal was nearly level. Eighteen flash-lock gates were there by the ninth century at the latest, reducing the number of towers needed for barges by regulating the level and the flow. They

were changed to pound-locks by the tenth or eleventh century. The Magic Canal came to be considered a sacred waterway with a dragon as its governing spirit. The dragon's emissaries were said to be blue snakes called 'dragon coils' which coiled playfully in the hands of visitors. A modern railway bridge goes right over the Magic Canal, which is still used. Unless one knows the importance it does not seem particularly impressive and can easily be missed. But no comparable canal seems to have been built in Europe until the beginning of the thirteenth century.

## THE PARACHUTE

Most people know that Leonardo da Vinci left sketches of the parachute, which was the first appearance of the idea in Europe. However the Chinese seem to have invented the parachute and actually used it well over 1000 years before Leonardo.

The first textual evidence we have for this is in the famous *Historical Records* of China's greatest historian, Ssuma Ch'ien, which was completed about 90 BC. We can therefore safely consider the parachute dating from at least the second century BC. Ssuma Ch'ien had access to vast archives, and the fact that he attributed the parachute to such remote antiquity means that its origins may well have been some centuries before this time.

As the story goes, the legendary hero, Emperor Shun, was fleeing from his father who wanted to kill him. He took refuge in a large granary tower, and his father set fire to it, hoping to burn him to death.

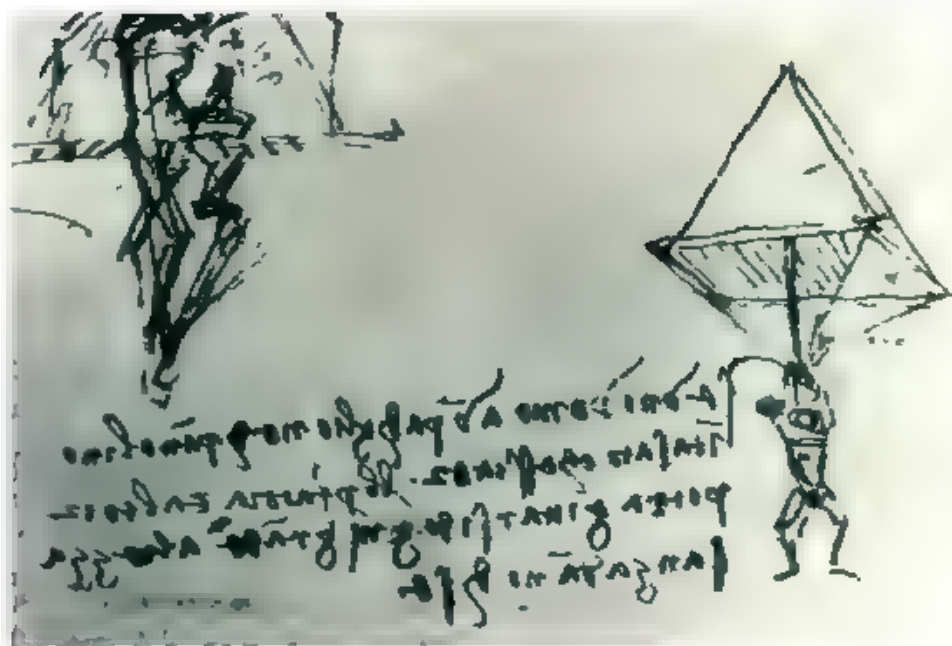


Abb. VI. 136. This is a famous sketch of a man descending with a parachute, drawn by Leonardo da Vinci (1452-1519). It was drawn many years earlier than the first parachute jump, which was made in 1783. The sketch was rediscovered in 1908, and it was then recognized that da Vinci had heard of parachutes in China. Marco Polo (1254-1324) had not only visited China along with other Italians two centuries earlier, but had left a detailed description of a man dying late in his own memoirs so that such things were in the air.

But Shun tied a number of large conical straw hats together and jumped, using them as a parachute. From this we can assume that there was indeed a jump by someone and that over the years the tale became attached to a legendary episode in the life of Shun. There was a commentary on the story in the eighth century AD by Ssuma Chen (a different person from the historian just mentioned), who remarked that the hats acted like the wings of a bird making Shun's body light and bringing him safely to the ground.

Needham brings forward a medieval mention of the use of the parachute, from a book called *Lacquer Table History* by Yo K'o. This book was published in 1214 and recounts events witnessed at Canton in 1192. In Canton at that time there was a large Arab community of merchants, who had their own mosques, one of which had a 'grey cloud-piercing minaret like a pointed silver pen' with a spiral staircase inside. At the very top was a huge golden cock, which was missing one leg. The leg had been stolen in 1180 by a cunning thief who had escaped by parachute. The robber's own account is preserved, for he seems to have been something of a local hero. He describes the escape as follows: 'I descended by

holding onto two wooden brellas without handles. After I jumped into the air the high wind kept them fully open, making them like wings for me and so I reached the ground without any injury.

We have documentary evidence that the first construction and use of a parachute in Europe was due to a report of a visitor to Thailand, who witnessed its use by Chinese and Siamese acrobats. The account was written by Simon de la Loubère, appointed Ambassador to Siam by King Louis XIV of France from 1687 to 1688. In his *Historical Relation* he wrote:

There dyed [died] one, some Years smce, who leap'd from the Hoop, supporting himself only by two Umbrella's, the hands of which were firmly fix'd to his Girdle, the Wind carry'd him accidentally sometimes to the Ground, sometimes on Trees or Houses, and sometimes into the River. He so exceedingly diverted the King of Siam, that this Prince had made him a great Lord, he had lodged him in the Palace, and had given him a great Title, or, as they say, a great Name.



The historian J. Duhem has established that L.S. Lenormand read this passage a century later, was stimulated to make trials, jumping from the tops of trees and buildings, and was quite successful. In 1783, Lenormand gave the invention its name of 'parachute'.

Lenormand told the brothers Joseph and Etienne Montgolfier about it and the famous pioneering balloonists were then responsible for A.J. Garnerin's jump from a balloon with a parachute in 1797. This was a direct result of a Westerner having witnessed Chinese parachutes. Needham remarks, aptly: 'There are not many cases in which so clear a line of transmission is detectable.'

It should be noted that the parachutes used in Siam in 1687 were just the same as the one that had been used by the chief at Canton 500 years earlier, namely, a pair of umbrellas. It is quite possible that the Cantonese chief was himself a professional acrobat, and therefore knew how to use the parachute successfully - and even more important, had the confidence to jump. Probably the pair of umbrellas was a stock-in-trade of the highest calibre acrobats for hundreds of years.

In June 1985 a woman named Yang You-hsiang of Liao-chiao in Hopei Province in China was carried 550 yards in the air by a tornado. She landed safely because she had been carrying an open umbrella which acted as a parachute. Her only injuries were from hailstones. (London *Daily Telegraph*, 22 June 1985.) Clearly very much in the national tradition!

## MINIATURE HOT-AIR BALLOONS

by C. C. CHEN

By the second century BC, the Chinese were making miniature hot air balloons using eggshells. A book that was written at that time, *The Ten Thousand Infallible Arts of the Prince of Hsuei-Nan*, mentions this pastime. Eggs can be made to fly in the air by the aid of burning tinder.

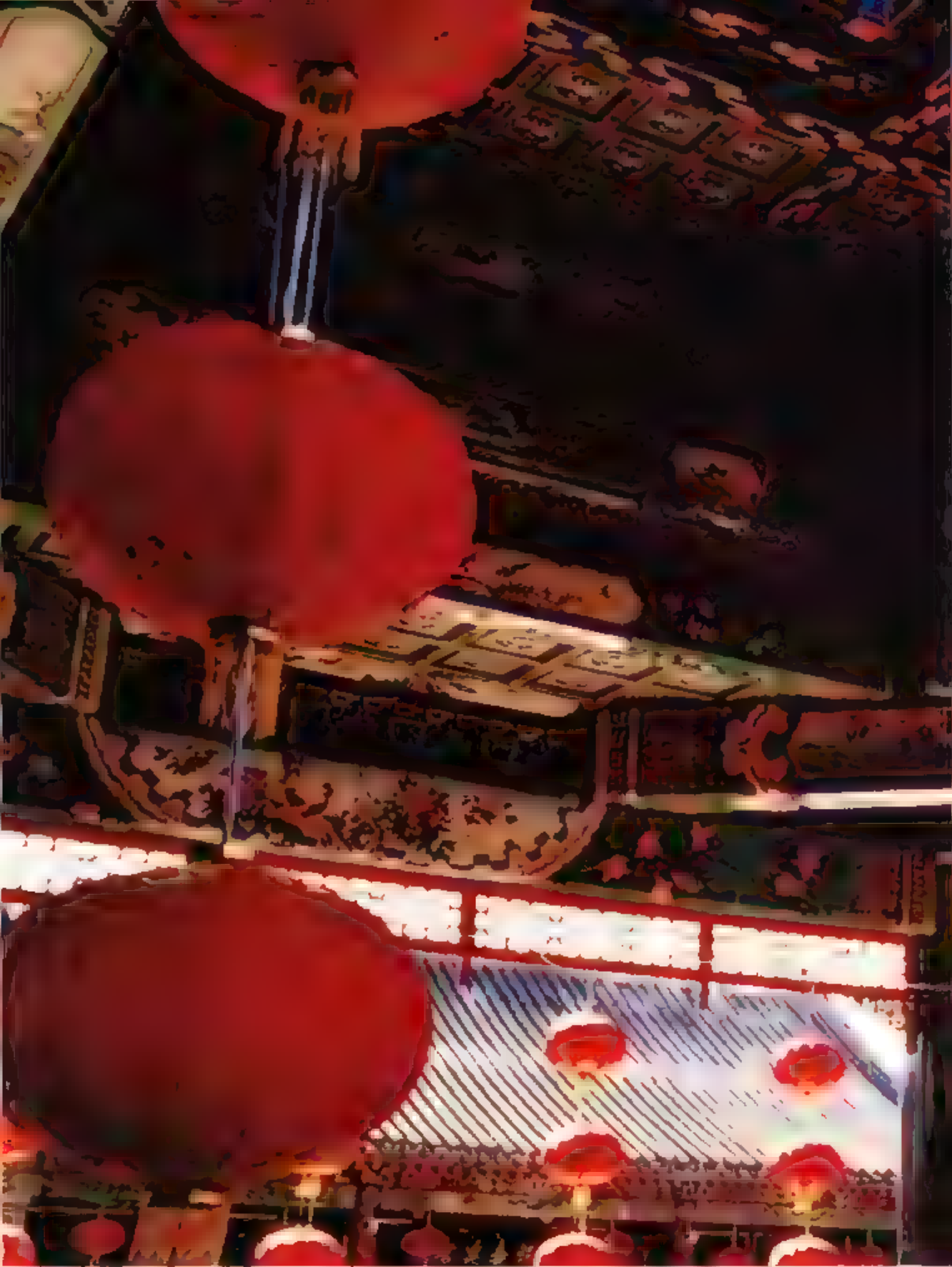
An ancient commentary added to the text explains further: 'Take an egg and remove the contents from the shell, then grind a little mugwort under inside the hole so as to cause a strong air current. The egg will of itself rise in the air and fly away.' Mugwort (*Artemisia vulgaris*) is a very common weed, the long dried stalks of which were used in China as tinder for lighting fires, and powdered as a flammable element in incense sticks.

Few references are found in Chinese writings to the use of the hot air balloon principle. Perhaps it was for a long time not thought worthy of much attention, but by medieval times the military possibilities were being exploited. There are several references in European chronicles to the use of hot-air balloons, shaped like dragons either for signalling or as standards by the Mongol Army at the Battle of Liegnitz in 1241. The principle was in all probability obtained from the Chinese, the Mongol Dynasty finally established full sway over all of China only 19 years after this.

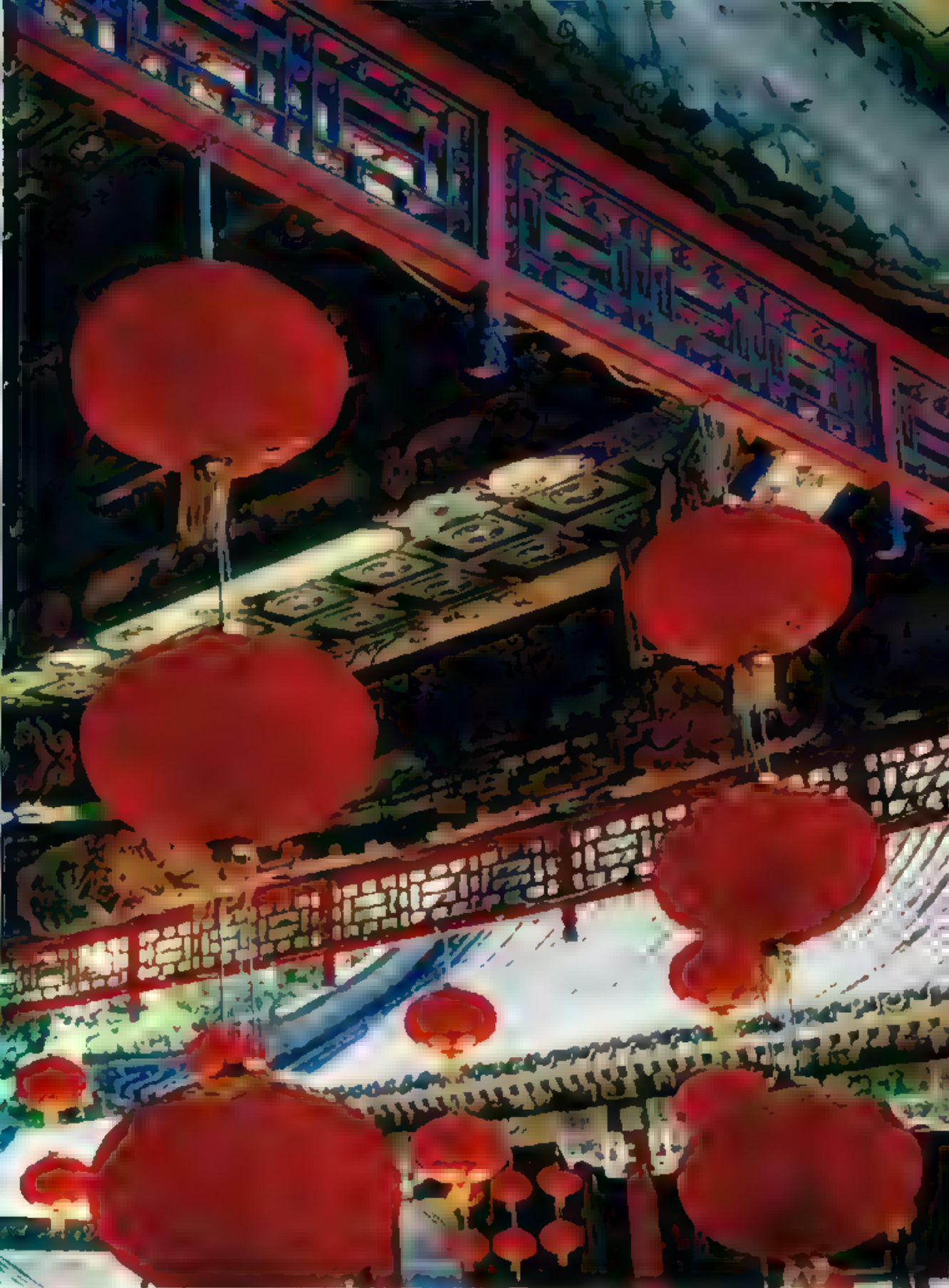
Needham has pointed out that paper was available in China so many centuries before anywhere else (from the second century BC) that the development of the classical globe lanterns would have encouraged experimentation. When their upper openings were too small and the source of light and heat unusually strong they must sometimes have shown a tendency to rise and float free of support.

A vivid eyewitness description of the use of hot-air balloons in the form of paper lanterns is provided by Peter Goullart, who lived between 1939 and 1949 in the Lichiang region of Yunnan Province in the south of China.

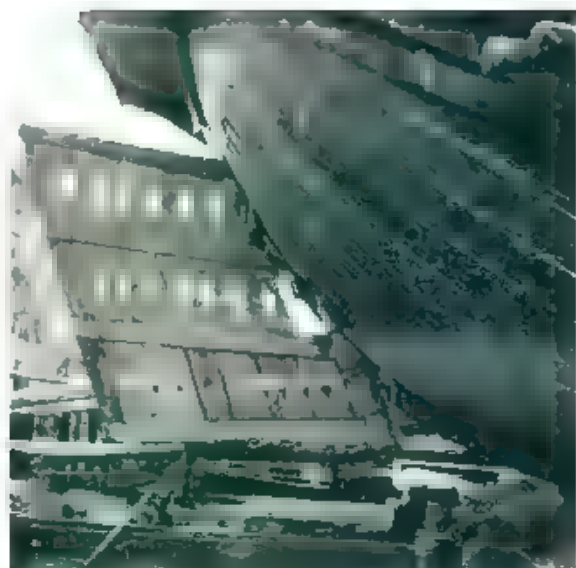
July, which was the critical month before the rainy season, had several festivals. With the rice already planted, the people did not have much to do and the evenings were devoted by the younger set to dancing and to flying the *kounimngteigs* - the lighted balloons. During the day one could see the young men pasting together the oiled sheets of rough paper to form the structure of a balloon. These balloons were then dried in the sun and were ready for use in the evening. Crowds gathered to watch. A bunch of burning mugwort was tied underneath, the balloon swelled and quickly rose into the air to the shouts of excited spectators. The higher it rose the more good luck it promised to its owner. Some went up very high indeed and floated in the sky like red stars for several minutes. At the end they burst into flames and fell, sometimes causing fires by setting light to straw in unwatched farm-houses. Sometimes there were as many as twenty of these balloons floating through the dark sky. Balloon flying lasted for about a couple of weeks and it was great fun.



ABOVE 1877 Chinese globe lanterns made of paper, like the one shown here, were used as miniature home air balloons in China for centuries.



The invention of paper came at about the same time as the first balloons were tested - the second century BC

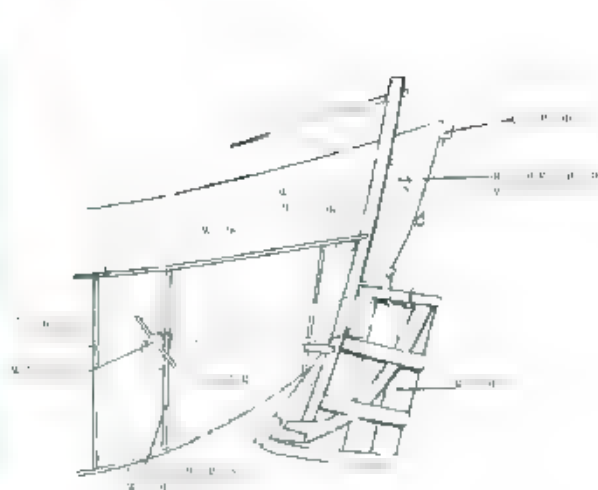


A view of the building showing the fenestrated rudder. The holes make it easier to see the interior of the building. The building is located in the city of London, England. The building is a historical structure, and the rudder is a historical artifact. The building is a historical structure, and the rudder is a historical artifact.

ABOVE: (RIGHT) The rudder and tiller of a Hanseatic ship. This is a historical rudder that is a historical artifact. The rudder is a historical artifact, and the tiller is a historical artifact. The rudder is a historical artifact, and the tiller is a historical artifact.



EST. 1400  
The rudder and tiller of a Hanseatic ship. The rudder is a historical artifact, and the tiller is a historical artifact. The rudder is a historical artifact, and the tiller is a historical artifact.



## THE RUDDER

Until Europeans adopted the rudder from the Chinese, Western ships had to make do with steering oars. This meant that long voyages of discovery by Europeans were impossible. The famous voyages of Christopher Columbus, Vasco da Gama, and others of their time were only made possible by the adoption of Chinese nautical technology. The oldest Western evidence for rudders is found in church carvings of about the year 1180. This is within a few years of the first European evidence for the ship's compass. Rudders and compasses thus seem to have reached Europe at about the same time, which is hardly surprising, since they were so closely associated. The rudder enables one to steer a ship properly, and the compass helped one to decide where to steer it.

The world's oldest representation of a rudder may be seen in Plate 140 (left). This is a pottery model of a Chinese ship excavated from a tomb dated to the first century AD. The model is about 1 foot 10 inches long, and its rope slinging tackle has long since rotted away. But a slung axial rudder may clearly be seen. (A slung rudder is one which can be raised and lowered by rope tackle; or chains; when entering shallows, it is often desirable to pull the rudder up so that it will not be snapped off.)

Chinese junk rudders grew to many times the size of a man. Huge ships with enormous rudders were used on the Chinese voyages of discovery which preceded the European ones. The Chinese sailed round the Cape of Good Hope in the opposite direction to



that taken by the Europeans and at an earlier time. They were also first to discover Australia, landing at the place now called Port Darwin. Chinese trade with the Philippines and Indonesia was common, and trade with the eastern coast of Africa was so extensive that pieces of broken Chinese porcelain are to be found scattered all up and down the beaches of Tanzania and Mozambique, dating back for centuries. The Chinese also made voyages to the American continents, though it is questionable whether they were return voyages. Many Asian influences have been identified in ancient America, by Needham and others. But the Chinese who arrived were quite possibly stranded, unable to return home owing to the greater difficulty of going westward than to the Pacific.

Another traditional Chinese invention was the 'fenestrated rudder', which put simply is a rudder with holes made in it (see Plate 138 (opposite)). The Chinese soon discovered that while easing the task of turning the rudder through the water, the holes did not appreciably diminish its steering function. However, it was not until 1841 that fenestrated rudders were introduced to the West. Until that time, a coal-fired torpedo boat travelling at 30 knots was unable to turn its rudder at speed. Fenestration made this possible.

The earliest rudders in China were what is called 'balanced' rudders. This means that part of the blade projected in front of the post. Such rudders are easier to use. The Europeans did not adopt them until the nineteenth century.

One of the earliest ships to use such a rudder was the *Great Britain* of 1843. The British were not the first to use it, but they were the first to put it to Chinese inventions for naval use, with the screw as well as the square-pallet chain pump as a bilge pump (see page 63), and watertight compartments (see page 211). It is no exaggeration to say that the superiority of the British Navy was to a large extent due to its readiness to adopt Chinese inventions more rapidly than other European powers.

## MASTS AND SAILING

It could probably be safely said that the Chinese were the greatest sailors in history. For nearly two millennia they had ships and sailing techniques so far in advance of the rest of the world that comparisons are embarrassing. When the West finally did catch up with them, it was only by adapting their inventions in one way or another. For most of history Europeans used ships which were classically inferior to Chinese ships in every respect imaginable. They had no rudders, no leeboards, no watertight compartments, single masts, and square sails,

FIGURE 14 A Yancheng

1. The mast is the mainmast.

2. The mast is the mainmast.

3. The mast is the mainmast.

4. The mast is the mainmast.

5. The mast is the mainmast.

6. The mast is the mainmast.

7. The mast is the mainmast.

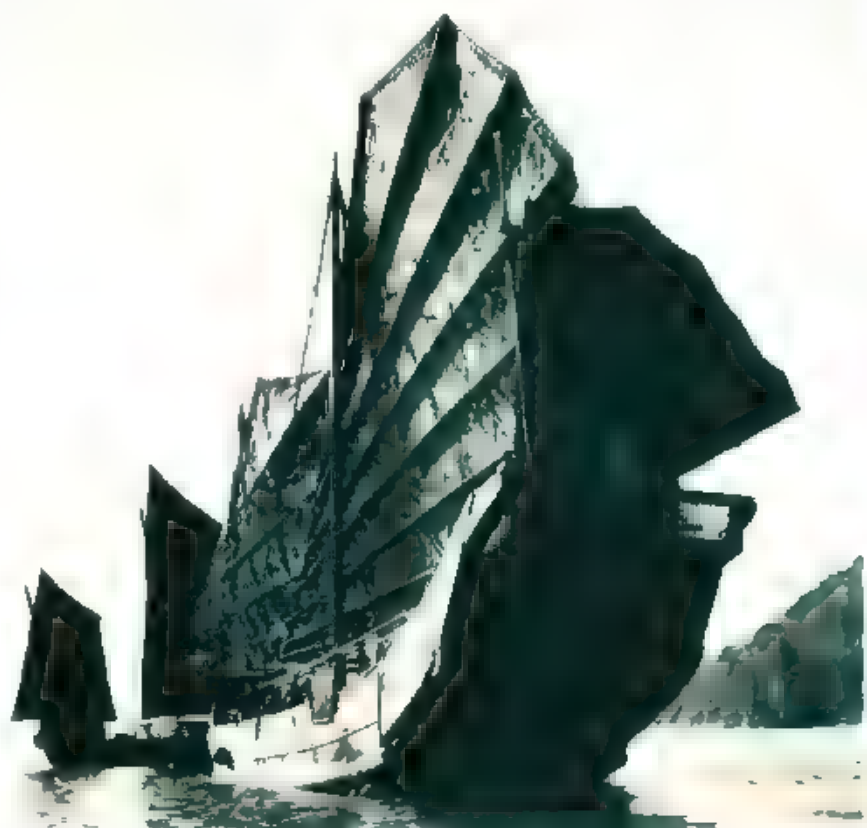
8. The mast is the mainmast.

9. The mast is the mainmast.

10. The mast is the mainmast.

11. The mast is the mainmast.

12. The mast is the mainmast.





ABOVE 42 A three-masted sailing Chinese junk of modern times, though favouring only an bowsprit, as the Chinese have here, while adopted or converted. This photo shows particularly clearly how the jibs are extended in front of the masts to the front edge of the sail, known as the 'uff' (no) behind the mast, which was a Chinese innovation and that the sails are rigged parallel with the bowsprit axis, not its keel, because Chinese junks do not have keels, rather than a right angle to it. It was the intelligent Western recognition that fore and aft rigging enables a ship to tack into the wind, which Western ships were incapable of doing with their square sails at right angles to the bowsprit axis, and the adoption of Chinese sailing techniques in the 19th century, which they copied since explorers and missionaries made their long voyages of discovery.

which left them at the mercy of the winds to an extent which today we would consider ludicrous. This continued to be the case even into the nineteenth century. As Needham says, 'As late as 1800 they sometimes had to wait as long as three months at Hamoaze in order to get into Plymouth Sound, and this was long after the introduction of a lateen sail on the mizzen mast.'

Chinese sails were innately superior to Western ones. Apparently commencing with sailing rafts, the Chinese had recourse to their native bamboo to aid sail construction. This led to the use of sails consisting of bamboo battens with matting stretched between them. Such sails could be hauled up and down like a set of open venetian blinds covered with cloth. Sailing in this way was easier than with Western canvas sails, for it was not necessary for sailors to climb along yard-arms to furl or unfurl the sails when the wind changed: everything could be done from the deck with windlasses and halvards. Furthermore, a sail with battens could be used

with as many battens exposed as one wished, in a gale, one could let two battens' worth of sail be exposed, but in a light breeze, the whole sail could be exposed to catch it. This added greatly to control of the vessel. Battens were not used in Western sails until modern racing yachts partially adopted them.

Bamboo and mat sails have another advantage: a ship can sail even if half of the sail consists of holes which have been torn in it, or which have appeared from rotting or other deterioration. A Western canvas sail could not work with so many holes. Also, the battens held Chinese sails taut, which was more efficient aerodynamically. There is unnecessary wind turbulence caused by sails which belly too much in the wind: this reduces speed. Even today, modern racing yachts are thought by some to have insufficiently taut sails and to allow far too much bellying. It is likely that there is still more to be learnt from Chinese sails amongst the yacht-racing fraternity.

However, the greatest advance of Chinese sails was to pass from the basic square sail to the fore-and-aft rig (which enables one to sail into the wind) using a lug sail. This is the sail which everyone has seen in pictures of Chinese junks (see Plates 141 and 142 (pages 205 and opposite)) It has been said that the batten-strengthened lug sail of the Chinese junk is the finest sail ever invented. A modern version of it is the gaff sail: the forward edge (called 'luff' by mariners) has been pushed back to commence at the mast rather than slightly in front of it.

Modern yachts have a gaff and a 'leg of mutton' or 'Bermuda rig' sail, the latter being more or less the hind half of a lug sail – an upright triangle. It is by no means certain that a modern yacht could outperform a comparable Chinese junk built for racing and using lug sails with battens in the classic manner. A race between two such vessels would be interesting. The junk is the direct ancestor of the yacht, but may still be better.

Fore-and-aft rigs with lug sails must have existed in the second-century AD China: by the third century they are clearly described in the book *Strange Things of the South* by Wan Chen, on ships capable of carrying the staggering amount of 700 people and 260 tons of cargo! Wan Chen describes these ships as having four masts, and says:

The four sails do not face directly forwards, but are set obliquely, and so arranged that they can all be fixed in the same direction (parallel to each other), to receive the wind and to spill it. Those sails which are behind the most windward one receiving the pressure of the wind, throw it from one to the other, so that they all profit from its force. If it is violent, [the sailors] diminish or augment the surface of the sails according to the conditions. This oblique rig, which permits the sails to receive from one another the breath of the wind, obviates the anxiety attendant upon having high masts. Thus these ships sail without avoiding strong winds and dashing waves, by the aid of which they can make great speed.

Another book of 260 AD by K'ang T'ai describes ships with as many as seven masts, used for sailing to Syria. The use of multiple masts was rendered easy and natural in Chinese ships due to the bulkhead construction of their hulls, which have a whole series of obvious cross-embers capable of providing bases for masts. Wan Chen

makes clear that as early as the third century, the Chinese were already well aware, in the region around Canton, of the best way to avoid one sail being becalmed by another behind it. They positioned the masts not directly in a row along the centre of the ship lengthwise, but staggered thwartwise from one side to the other. This brilliant idea was never adopted in the West, even the fastest Yankee Clippers, of which Europe was once so proud, had the pedantic feature of the masts marching along straight above the keel, so the rear sails becalmed the fore sails.

The only way to sail into the wind is by freeing oneself from the fixed notion that a sail must be the traditional square sail, whose basic position is at right angles to the boat. It is true that there is a tedious process known as 'wearing', by which square-sailed boats loop round over and over again and slowly creep into the wind. But the only efficient method is what is called 'tacking', and this cannot be done with a square sail.

What is needed in order to tack into the wind is a fore-and-aft rig, a sail whose axis is essentially along the long axis of the boat, rather than at right angles to it. On such a rig, the mast is no longer just a long pole holding up the square sail, but becomes a pivot for the sail to swing to one side and then to the other to catch the wind on alternate sides as the ship tacks. This the Chinese did.

When sailing into the wind, a tacking ship can experience a great deal of leeward drift, blowing the ship too much sideways and making too little progress forward. The Chinese therefore invented the leeboard to prevent this. This is basically a board lowered into the water on the lee side of the ship (opposite the direction of the wind) to exert pressure on the water and prevent drift in that direction; it also helps to hold the ship upright. Sometimes the leeboard would be lowered from a slot in the centre of the ship, in which case it can be called a centre-board.

Leeboards existed in China from at least the eighth century. In a book by Li Ch'uan of 759 AD entitled *Manual of the White and Gloomy Planet [of War, Venus]*, we are told of leeboards on certain warships that they 'held the ships, so that even when wind and wave arise in fury, they are neither driven sideways, nor overturn'. Leeboards did not appear in Europe before about 1570, however, when they were adopted by the Dutch and Portuguese who were then trading with China.

When Europeans eventually made their way to China and saw the Chinese ships, with their many masts





The Pacific Ring of Fire is a major area of seismic and volcanic activity, forming a nearly continuous zone around the Pacific Ocean basin. It is characterized by a high frequency of earthquakes and volcanic eruptions. The Ring of Fire is composed of several tectonic plate boundaries, including the western coast of the Americas, the Hawaiian Islands, the western Pacific, and the eastern Pacific. The map shows the distribution of earthquakes and volcanic activity in the Pacific region, with red lines and arrows indicating seismic activity. The map also shows the distribution of volcanic activity, with red dots indicating the locations of volcanoes. The map is a valuable tool for understanding the Pacific Ring of Fire and its impact on the world.



and their fore-and-aft rigs, they were immensely impressed. The first attempt to copy what they saw was the adoption in Europe of multiple masts on ships, with square sails on the fore masts but a fore-and-aft rig for the mizzen mast at the rear of the ship. Since the Arab lateen sail was ready to hand, it was the lateen which was fitted to the mizzen of the European three-masteds commencing about 1304, not long after Marco Polo's time in China. But the idea was slow to be assimilated and only a couple of centuries later did such ships really come into their own.

In 1492 Christopher Columbus sailed such a ship to America. All the Western three-masteds of the sixteenth and seventeenth centuries carried lateen sails aft. After that, the more efficient gaff sail replaced the lateen on the mizzen mast of European vessels. The actual Chinese lug sail apparently did not make an appearance there before the sixteenth century in the Adriatic. Certain traditional Venetian boats with lug sails appear to be direct copies of Chinese vessels in other respects as well, having nearly flat bottoms and enormous Chinese-style rudders.

The nautical historian H. Warrington Smyth said that these Venetian craft are 'one of the finest forms of sea-going lugger in the world'. They are thought to have derived from designs of Chinese ships brought back by Marco Polo and his Italian peers. But the luggers remained regional, the main line of European development taking the idea of the Chinese ship rather than the design. This was undoubtedly a mistake for the great European sailing ships were only inefficient compared to sea-going junks, of which Smyth had this to say: 'As an engine for carrying man and his commerce upon the high and stormy seas as well as on vast inland waterways, it is doubtful if any class of vessel is more suited or better adapted to its purpose than the Chinese junk, and it is certain that for flatness of sail and for handiness, the Chinese rig is unsurpassed.' Needham adds: 'The Chinese balance lug ranks indeed among

the foremost achievements in man's use of wind power.

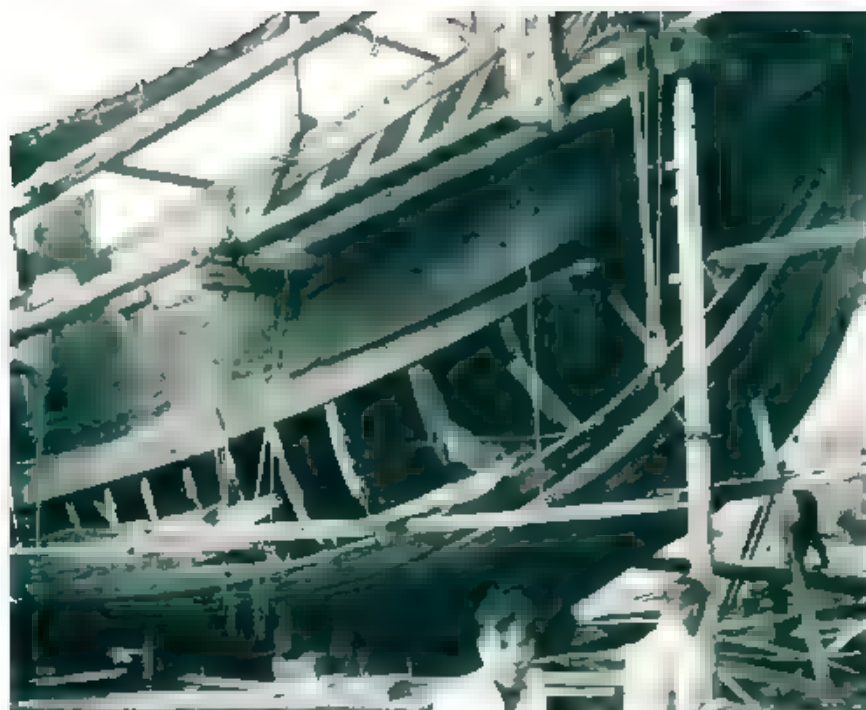
It is probably a lack of bamboo for battens which held back the adoption of the lug sail in Europe except in special localities like the Adriatic, or amongst the Portuguese on their *lortins* of the sixteenth century. The Chinese stimulus to European sailing was therefore not as powerful as it might have been if direct copying had taken place in rigs, and with masts. But in summing up the situation, it might be well to quote the views of another nautical historian, G. S. Laird Clowes:

In 1400 AD northern ships were entirely dependent on a fair wind, and were quite unable, indeed never attempted, to make headway against an adverse one. Before 1500 AD European ships had been able to make the long ocean voyages which had resulted in Columbus' discovery of America, Dias' doubling of the Cape of Good Hope, and the opening of the Indian Ocean trade route by Vasco da Gama. Other scientific advances, such as the introduction of the mariner's compass from China, bore their part in making such voyages possible, but without the far-reaching improvements in masts and sails the great discoverers could never have accomplished their work.

沙船式

(M. T. 144) A. Illustration of a small Chinese fighting ship of the Ming dynasty or earlier, published about 1700. The wood block for the plate probably dates from at least 500 AD. It is the first appearance in Chinese of the fighting ship with a mast that is shorter than its other fighting masts, with swords or spears. Particularly clear are the cat-paw markings with their curved, curved blades or curved blades according to the wind, which are equipped by ropes, and even so, remarkably efficient that the little attack boat could manoeuvre round the bigger ships like swooping swallows. It was for lack of such cat-paws that Western ships were so inferior, partially because of the unavailability of bamboo in the West (the suitable material for cat-paws is bamboo and battens were therefore never thought of) (Collection of Richard T. Smith).





After a gap of at least 1300 years, Europeans thus adopted Chinese concepts of rigging in every way, whether for navigation, propulsion, or steering. Europeans were dependent upon Chinese ideas in order to be capable of the great voyage of Discovery. The great colonial powers of the West, the Portuguese, British, French, and other Empires, were the direct result of the adoption by Europeans of Chinese technology on the high seas.

## WATERTIGHT COMPARTMENTS IN SHIPS

From at least the second century AD, if a traditional Chinese ship received a hole of any kind in its hull, the ship would not sink. This is because the Chinese constructed hulls on the bulkhead principle. A bulkhead is an upright partition separating compartments. A typical medium-sized freighter had fifteen bulkheads and thirty-seven rib frames. What could happen would merely be that one of the sixteen bulkhead compartments would flood but the other fifteen being sealed off from it, would remain dry and the ship would continue to float. There is no way of ~~imagining how many~~ thousands of lives would have been saved if Western ships had been built on such sensible principles but they were not.

Just how novel this technique was only 200 years ago may be seen from a letter written in 1787 by Benjamin Franklin about the mail packets which were exchanged between the United States and France. As these vessels are not to be laden with goods, their holds may without inconvenience be divided into separate apartments, after the Chinese manner and each of these apartments caulked tight so as to keep out water.

The idea of watertight compartments for ships' hulls was brought to Europe from China by Sir Samuel Bentham (1757-1831), long-time chief engineer and architect of the British Navy. As a young man in 1782, he travelled through Siberia to China and studied Chinese ship construction. He campaigned in Europe for bulkheads, so that by 1795 the Lords Commissioners of the Admiralty asked him to design and build six sailing ships of a new design with partitions for buoyancy, strength, and securing the ship against foundering, a practise by the Chinese of the present day.

As late as 1824 naval writers were still breathlessly expostulating upon the miracle of this simple technique. In that year, a report in *Mechanics Magazine* stated: "There is a method of making it almost impossible to sink ships which is now employed by the Chinese. The hold is divided into a number of compartments so that if the ship springs a leak, or her sides are stove in she will remain afloat."

From a letter written by Benjamin Franklin in 1787 about the mail packets which were exchanged between the United States and France. As these vessels are not to be laden with goods, their holds may without inconvenience be divided into separate apartments, after the Chinese manner and each of these apartments caulked tight so as to keep out water.

What is surprising is that these ideas were clearly described by Marco Polo in 1295, but no one paid any attention. They were repeated in 1444 by Nicolo de Conti in his own *Travels*, where he said 'These Shippes are made with Chambers, after such a sorte, that if one of them should breake the others may goe and finish the Voyage' But so conservative were European shipbuilders and sailors that it took 500 years after the principles of watertight compartments were made known to the West for them to be adopted.

A small exception to this must be mentioned. In about 1712, some English fishermen adopted the Chinese principle of a sealed hull compartment which could be free-flooded under controlled conditions (recorded in a Chinese text of the fifth century AD and doubtless much earlier than that). The purpose of this 'wet-well' in a ship called a 'wet-smack' was to enable fishermen to bring their fish to port fresh, still swimming in water. This is a traditional Chinese practice. In China, such free flooding compartments were also used to raise and lower the level of a boat when shooting rapids in rivers, giving the captain control over the amount of water resistance of his ship by acquiring and discharging water ballast. The flooded compartments would be emptied by big pumps using the square-pallet chain-pump design, which the British Navy also adopted directly from the Chinese.

The bulkhead construction of ship hulls was a natural notion which the Chinese derived from copying the bamboo, which has transverse septa dividing the stem into a series of compartments. Since Europe did not have bamboo, this inspiration was not to hand.

The use of bulkheads afforded an obvious multiplicity of strong cross-timbers in the hull capable of receiving masts. This not surprisingly resulted in the adoption of multiple masts in Chinese ships which caused such amazement to Westerners in medieval times and led to the adoption of multiple masts in Europe.

A highly conservative estimate for the adoption of transverse bulkheads in Chinese ship hulls would be the second century AD. Although rafts and coracles were in profuse use at that time, there is no reason to believe that proper ships did not exist before then, whose bulkheads were effectively watertight (if not by design, then at least as a result of the way the hulls were constructed). The bulkhead construction principle may therefore be much older.

## THE HELICOPTER ROTOR AND THE PROPELLER

THE HELICOPTER ROTOR

A description of a helicopter top dating from the fourth century AD was mentioned by the philosopher and alchemist Ko Hung (see the account of manned flight with kites, page 191). By then, helicopter tops seem to have been common toys in China, one of the names most generally used for them being 'bamboo dragonfly'. The top was an axis with a cord wound round it, and with blades sticking out from the axis and set at an angle. One pulled the cord, and the top went climbing up into the air. This simple but fundamental toy had a very important effect on the European pioneers of aviation.

Sir George Cayley, the father of modern aeronautics, studied the Chinese helicopter top in 1809. It had two sets of rotor blades (using feathers, in this case), and a winding device using a spring. This Chinese 'bamboo dragonfly' could rise 20-25 feet in the air. Cayley set about trying to make an improved version. His drawings of 1853 portray his own helicopter top, which could mount 90 feet in the air. Encountering the Chinese helicopter top in 1792 (by way of two Frenchmen, Launoy and Bienvenu), had stimulated Cayley to take an interest in the possibilities of aviation in the first place.

The helicopter top was the model for what became the propeller of modern aircraft. But the Chinese had also preceded Europe in vertically mounting these rotors, as was necessary for use in airplanes. Early in the seventeenth century, kite-flying was temporarily banned in China. Liu Tung tells us in his book of that time, *Descriptions of Things and Customs at the Imperial Capital* that people turned instead to vertically mounted 'wind-wheels', which amused people by their pretty red and green colours, which flashed rapidly as the wheels turned in the wind. The wind wheel could be either set stationary or carried in the hand on sticks. There were also pinwheel varieties, which were able to perform work by depressing a lever and beating a drum. Some of the Chinese wind-wheels may be seen in a painting made in 1310 by Wang Chen-P'eng. We also know of wind-wheels being attached to cambered kites, set vertically mounted but spinning in the wind 'just for joy'. The Chinese were thus amusing themselves with actual miniature airplanes with proper airfoil wings and propellers, but merely letting them flit about in the wind. There is no record of their having



attempted to harness a power source to the propeller, and make the kite fly by becoming a sail airplane. Thus, the Chinese invention of the helicopter was lost to the Chinese as a working but unscientific and phantasm. But in the West in the West 1400 years later was to be born all the key elements to the birth of modern aeronautics and manned flight.

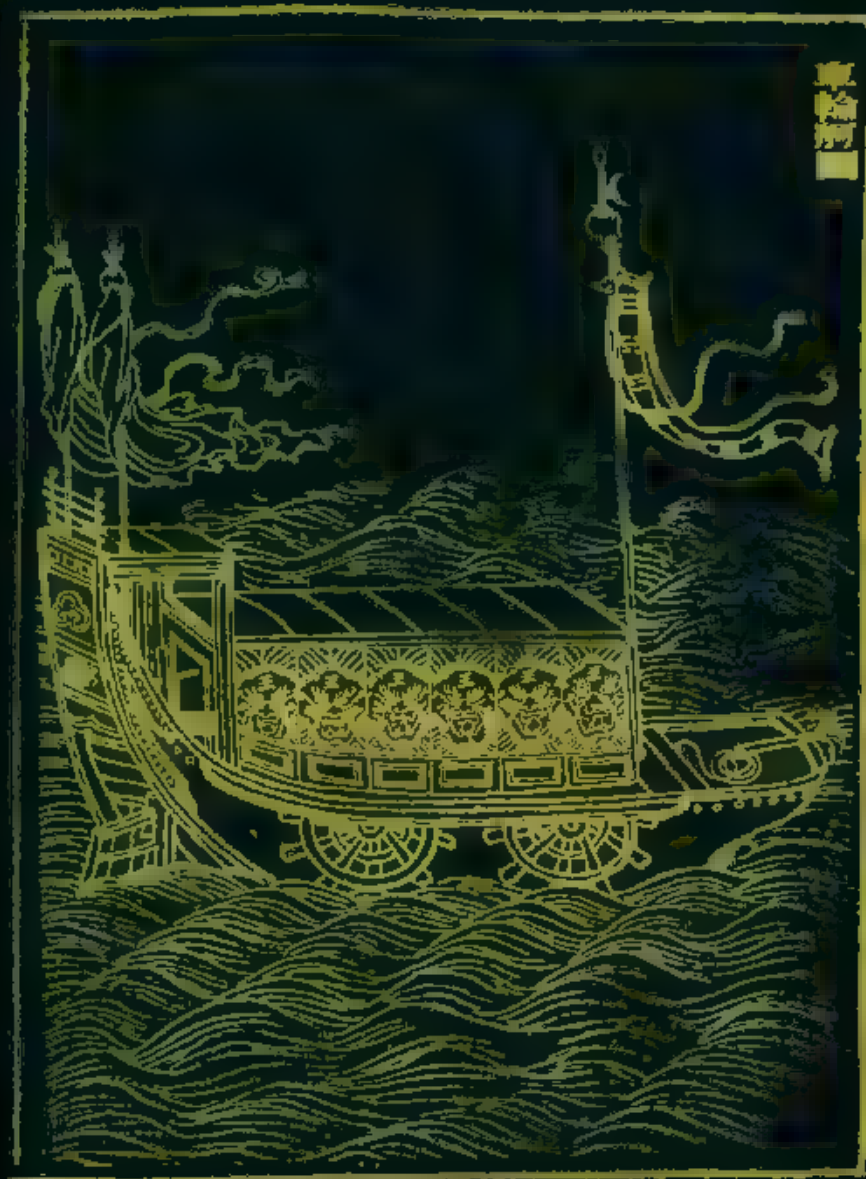
## THE PADDLE-WHEEL BOAT (FIFTH CENTURY AD)

The idea of the paddle-wheel boat was apparently known to early European inventors though the earliest boats to have been constructed and involved

very seriously James Gordon, an American manuscript collector. *De Rebus Silesiis*, which he brought to China from the late fourth century, contained the suggested design for a ship with three pairs of paddle-wheels powered by the men walking around and round on the deck, as if grinding a mill. It is considered unlikely that the vessel existed, but even more unlikely that it is the paddle-wheel thought conceived, the original idea seems to have been European, but the first execution Chinese with the connection between the sea in Europe, therefore, the idea led to nothing, while in China it led to the building of hundreds of thousands of ships.

The first record of the existence of paddle-wheel boats comes in a Chinese account of a naval action

under the command of Wang Chen-Qi, one of the admirals of the Liu Sung Dynasty in 418 AD. This is described in *The History of the Southern Dynasties* (compiled in 671).



LEFT (146) This picture of a Ming Dynasty paddle-wheel battleship dates from about 1570, but this probably means the date of the Beijing publication *Sinang*. The illustration shows a battleship with a dragon-headed prow and a dragon-headed stern, and a small figure of a person on the deck. The ship is shown on a wavy sea. The text on the right side of the image is in Chinese characters. The ship is shown from a side-on perspective, moving towards the right. The hull is decorated with a dragon motif. The paddle-wheels are large and have many blades. The ship has a high superstructure with a flag on the stern. The sea is represented by stylized waves. The sky is not shown.



▲The Longevity Palace (Longevity Pavilion) at the Summer Palace in Beijing, China. The building is a two-story structure with traditional Chinese architectural features, including a dark tiled roof and white walls. It is illuminated at night, with warm lights glowing from the windows and arches. The building is situated on a platform overlooking a body of water, which reflects the lights and the structure. The sky is dark, and the overall atmosphere is serene and historic.

Wang Chen-O's forces sailed in covered swooping assault craft and small war-junks. The men propelling the boats were all hidden inside the vessels. The Ch'iang [barbarians] saw the ships advancing up the Wei [river] but could not see anyone on board making them move. As the northerners had never encountered such boats before, every one of them was sore afraid, and thought that it was the work of spirits.

An improved version was made by Tsu Ch'ung-Ch'ih between 494 and 497. His boat was called the 'thousand-lagae boat', and was tested on the Hsin-T'ing river, south of modern Nanking. It could travel enormous distances in a single day without the aid of wind, and must have represented a considerable refinement of the earlier designs.

An admiral of the Liang Dynasty, Hsu Shih-P'u, used a number of paddle-wheel boats in his campaign against the rebel Hou Chung in 552. His paddle-wheel boats were called 'water-wheel boats'. And in another campaign against the same rebel, the admiral Wang Seng-P'ien is described as having in his fleet 'ships which had two dragons on the sides to enable them to go very fast'. The text is thought to have become confused, and originally to have stated 'two wheels'. And at the siege of Lu-Yang in 573, another admiral, Huang Fa-Ch'iu, who was also a distinguished military engineer, built and used a number of 'foot-boats', which were obviously paddle-wheelers operated by foot treadles.

Between 782 and 785, Li Kao, prince of Tang, was Governor of Hungchow. The official history of the time tells us that

Li Kao, always eager about ingenious machines, caused naval vessels to be constructed, each of which had two wheels attached to the side of the boat, and made to revolve by treadmills. These ships moved like the wind, raising waves as if sails were set. As for the method of construction it was simple and robust so that the boats did not wear out.

We are also told of these ships that their speed was faster than a charging horse.

During the medieval Sung Dynasty the paddle-wheel warships really came into their own. They were often rudderless and manoeuvred swiftly and with breathtaking agility by means of a complex system of

using varying combinations of their paddle wheels – perhaps three out of six on one side then two on the other, and so on. They were able to dart in and out between other ships and wreak great havoc. Some of them had rammers fitted to their prows.

The admiral Shih Cheng Ch'ih in 1168 is recorded as having constructed a 100-ton warship propelled by a single twelve-bladed wheel. This means that some of the paddle-wheel boats were stern-wheelers. And when boats are described, as they often were, as having odd numbers of wheels, one would have been at the stern and the others in opposite pair formation along the sides. However, even though the wheels would have been opposite each other, they would almost certainly have worked quite independently, so that one could stop and the opposite one rotate. This seems to have been the method of steering.

We have an account from 1130 of the construction of some naval paddle-wheel ships.

Kao Hsüan, who had formerly been Chief Carpenter of the Yellow River Naval Guard Force, and of the Pai-p'o Vehicular Transport Bureau of the Directorate of Waterways, submitted a specification for wheeled ships which he claimed could cope with the enemy. He first built an eight-wheel boat as a model, completing it in a few days. Men were ordered to pedal the wheels of this boat up and down the river, it proved speedy and easy to handle whether going forwards or backwards. It had planks on both sides to protect the wheels so that they themselves were not visible. Seeing the boat move by itself like a dragon, onlookers thought it miraculous.

Gradually the number and size of the wheels were increased until large ships were built which had twenty to twenty-three wheels and could carry two or three hundred men. The pirate boats, being small, could not withstand them.

By this time, the paddle-wheelers came to be called 'wheel ships', and the terminological confusion which had existed for several centuries, when a wide variety of colourful names were used for them, settled down to a standard term. Technological improvements on the 'wheel ships' went on apace. Not long afterwards, Cheng Ch'ang-Yü constructed 'wheel ships' up to 300 feet long, capable of carrying between seven and eight hundred men.

The rebels ('enemies') mentioned above captured some of the 'wheel ships', together with the engineer Kao Hsuan. Thus commenced an arms race, with the rebels for a time building bigger and better 'wheel ships' than the Southern Sung Dynasty against which they were in revolt. As we are told in a contemporary history, 'Within two months the pirate bases had over ten many-decked wheel ships that were stronger and better constructed than the government ships.'

At the height of the conflict, the rebel fleet had several hundred 'wheel ships' of this type in operation. It must be emphasized that these ships were quite unsuitable for sea operations, and all the naval engagements took place on rivers and lakes. At a later period of history, under the Mongol Dynasty, when naval operations concerned the sea rather than inland waters, the use of paddle-wheelers went into serious decline. But at the culmination of the Sung period's conflict with the rebels in the twelfth century, paddle-wheelers reached what was probably their most extreme form.

The imperial forces in their turn imitated the paddle-wheel ships of the rebels but made them larger — as much as 360 feet in length, 40 feet in the beam and with masts 72½ feet high. The largest number of men on record for working treadles on a 'wheel-boat' is two hundred. Needham believes that the medieval paddle-wheelers of the Chinese could generate 50 horsepower and would have averaged a speed between 3½ and 4 knots. After this time, paddle-wheelers diminished in size, and also in importance. But they were still around until modern times, and saw naval action against the British in 1841 during the Opium Wars. The British believed them to be rapidly constructed copies of the British Navy's own paddle-wheelers, unaware that the Chinese had been using such ships for sixteen centuries by that time. Indeed, as recently as 1929, paddle-wheelers were still in use for carrying passengers up and down the Pearl River near Canton, though none is known to survive.

## LAND SAILING

AUGUST 1950

Land sailing, particularly on beaches, has become a popular sport today in the West. It originated in sixth-century China. About 550 AD, the Liang Emperor Luan (552-4) a Taoist scholar, wrote his *Book of the Golden Hall Master*. In it he recorded

Kaots'ang Wu-Shu succeeded in making a wind-driven carriage which could carry thirty men, and in a single day could travel several hundred li (hundreds of miles).

These developments continued, and we have the following account, from a book called *Continuation of the New Discourses on the Talk of the Times* of a very large vehicle built for the Emperor Yang of the Sui Dynasty about 600. It is thought that the account though obviously exaggerated, describes a genuine sailing vehicle, or at least a vehicle whose progress was significantly assisted by sails whatever other form of propulsion or haulage it may also have had.

Yuwen K'ai built for Sui Yang Ti a 'Mobile Wind-Facing Palace', it carried guards upon its upper deck, and there was room for several hundred persons to circulate in it. Below there were wheels and axles, and when pushed along it moved quite easily as if by the help of spirits. Among those who saw it there was no one who was not amazed.

One notices that the vehicle was pushed along by some normal means, and sails fitted to the vehicle rendered it astonishingly light, so that this was a semi-sailing carriage, or sail-aided carriage. Such assistance from sails in later times even came to be applied to ploughs: it must have made quite a sight to have farmers going up and down their fields with their ploughs pulled by wind power. But this always seems to have been something of a rancy, unlike the commonplace nature of sailing wheelbarrows.

The Chinese invented the wheelbarrow by the first century BC (page 95). At some unknown time after the first application of the sail to land travel, as just described sails were put onto wheelbarrows. A F. van Braam Houckgeest inspected a native Chinese sailing wheelbarrow closely and did a careful drawing of one, which he published in 1798 in his book *An Authentic Account of the Embassy of the Dutch East India Company to the Court of the Emperor of China in the Years 1794 and 1795*. It has the batten sails and multiple sheets which were so characteristic of Chinese ships.

Sailing wheelbarrows known as sailing carriages to Western visitors, caused a sensation in the West when they became known to the public, from the sixteenth century. From that date for about two centuries, an imaginary view of a sailing carriage





... into Europe from China by Stevin's cart which swept over Holland at this time and which has gone down in history where there was such excitement over ships that people ...

was drawn on nearly every atlas map which showed China. Milton even mentioned them as *Pure Land*. Last in 660 speaking 'Of Sericana where Chinese drive With Sails and Wind their can e Waggon light' (III, 431).

Jan Huyghen van Linschoten in his *Itinerario of the Voyage*

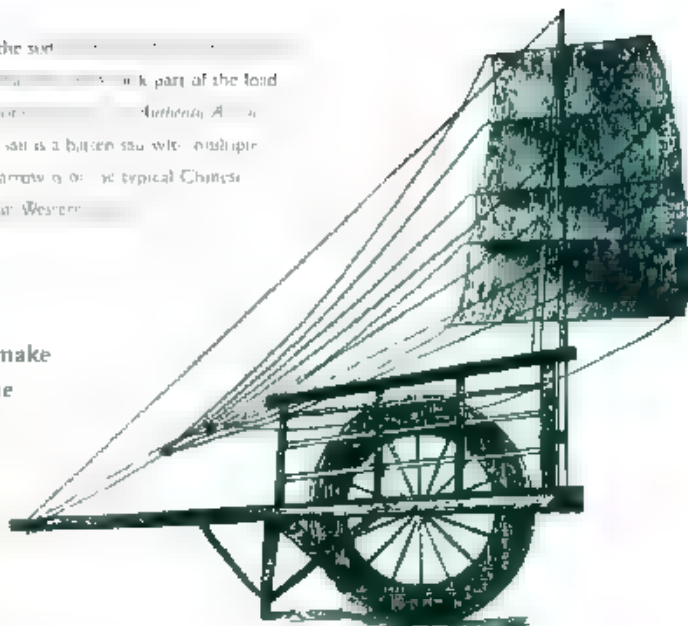
The men of China are great and cunning workemen, as may well bee scene by the Workmanship that commeth from thence. They make and use (waggones or) caries with sayles (like Boates) and with wheelles so subtilly made, that being in the Felde they goe and are driven forwards by the Winde as if they were in the Water.

Less frequently seen since they were in less accessible ... these ice-vachts which ran along the ice on wheels by sail power. Contemporar

ice-vachts were in use in 1935 on the Liao River near Ying-kou in the cold region of Manchuria.

The great Dutch scientist and mathematician Simon Stevin actually constructed a Chinese sailing cart age in the autumn of 1601. Stevin was deeply influenced by Chinese science, and helped to transmit to the West the Chinese inventions of decimal fractions and equal temperament in music (pages 157 and 234). Stevin's land-sailer carried Prince Maurice of Nassau, the young scholar Constantijn and many dignitaries along a beach at great speed. It covered a distance of ... in less than 2 hours so that its average speed was 3 miles per hour, and it must have reached 4 ... gave Europeans their very first taste of transport and is thought to have exerted a profound psychological effect which lasted in various subtle ways and helped prepare for the 'modern age'. We are fortunate to have a vivid description written six years later by G. Sendi.

RIGHT (149) Land sailing was being practised in China from the start. The form of it was in the attachment of a sail to a wheelbarrow, which was a part of the land. Here we see an engraving from A. E. van Broom Houtgeest, Authentic Account of the Embassy of the Dutch East India Company to China. The sail is a battened sail with multiple shrouds (rigging), of the sort used on Chinese junks. The wheelbarrow is of the typical Chinese form with a central wheel, which can carry far greater loads than Western wheelbarrows.



Also he stepped aside to Scheveling, to make trial of the carriage and swiftness of the waggon, which some years before was made with such Art, that it would run swiftly with sails upon the land, as a ship does in the sea. For he had heard how *Grave Maurice*, after the victory at Nieupoort, for trial sake, got up into it, with *Don Francisco Mendoza* taken in the fight, and within two hours was carried to Putten which was 54 miles from Scheveling. He therefore would needs try the same, and was wont to tell us, how he was amazed, when being driven by a very strong gale of wind, yet he perceived it not (for he went as quick as the wind), and when he saw how they flew over the ditches he met with, and skimmed along upon the surface only, of standing waters which were frequently in the way, how men which ran before seemed to run backwards and how places which seemed an huge way off, were passed by almost in a moment, and some other such like passages.

## THE CANAL POUND-LOCK

Everyone who has seen a modern canal will be familiar with the pound-lock. It has two gates. The boat enters by one, which closes behind it. The water level in the lock then either rises or falls to match the level of the water towards which the boat is sailing. When it has done so, the further gate opens and lets the boat through. The first certain date for a pound-lock in Europe is 1373.

The canal pound-lock was invented in China in 984 AD. The inventor was Ch'iao Wei-Yo, who, in 983, had been appointed Assistant Commissioner of Transport for Huai-nan. The impetus for his invention

was a concern over the enormous amounts of grain which were being stolen during canal transport at that time. Grain was the normal tax payment throughout China's history. Movement of the grain to central repositories and warehouses was the life-blood of the Empire, and therefore any substantial interruption of this process was a very serious social and political problem.

Until 984 boats could only move between lower and higher water levels in canals over double slipways. Chinese boats had no keels and were nearly flat-bottomed. A form of portage had been developed in China therefore, whereby slipways originally designed to regulate water flow were elongated in gentle ramps both front and back leading into the water. A boat would come along and be attached to ropes turned by ox-powered capstans. Within two or three minutes the boat would be hauled up a ramp to the higher level and for a moment would balance precariously in the air. Then it would shoot forward like an arrow out of a bow and scud along the canal at a level several feet higher than it had started. Passengers and crew had to dash themselves rigidly to the boat to avoid being hurled into the air and injured. The great disadvantage of this ingenious technique was that boats often split apart or were seriously damaged by the wear and tear of being dragged up the stone ramps. Whenever a boat broke up on a ramp, the contents would promptly be stolen by organized gangs, including corrupt officials, who waited for just such an occurrence. Sometimes apparently, the

ships were roughly handled on purpose or were artificially weakened or had even been chosen for their weaknesses so that an 'accident' of this kind could be brought about intentionally.

Ch'iao Wei-Yo was determined to wipe out this practice. He therefore invented the pound-lock so that double slipways would not be needed. Here is how the official history of the time relates the story:

Ch'iao Wei-Yo therefore first ordered the construction of two gates at the third dam along the West River (near Hsai-yin). The distance between the two gates was rather more than 50 paces [250 feet], and the whole space was covered over with a great roof like a shed. The gates were 'hanging gates', when they were closed the water accumulated like a tide until the required level was reached, and then when the time came it was allowed to flow out.

He also built a horizontal bridge between the banks, and added dykes of earth with stone revetments to protect their foundations. After this was done to all the double slipways the previous corruption was completely eliminated, and the passage of the boats went on without the slightest impediment.

Pound-locks made true summit canals possible. Water levels could differ by 4 or 5 feet at each lock without any problem at all. Over a stretch of territory, therefore, a canal could rise more than 100 feet above sea level as was the case with the Grand Canal for instance (rising 118 feet above sea level). This made possible a vast extension of the canal network and freed hydraulic engineers from many awkward topographical restrictions. Pound-locks were fitted into the Magic Canal (page 98) by the tenth or eleventh century.

The use of pound-locks meant that precious water could be saved. Many of the Chinese canals went dry in the summer, and days might have to pass before enough water had accumulated from the length of a canal for a flash-gate to be opened to let boats through. There

could be hundreds of boats waiting at any given gate. But with the pound-lock, only the one lockful of water was used each time. This meant that the canals, by saving water, could extend the months of their usefulness. Also, Shen Kua tells us in his *Dream Pool Essays* of 1086 of a single canal

It was found that the work of 500 labourers was saved each year, and miscellaneous expenditure amounting to 1,250,000 cash as well. With the old method of hauling the boats over, burdens of not more than 21 tons of rice per vessel could be transported, but after the double gates were completed, boats carrying 28 tons were brought into use, and later on the cargo weights increased more and more. Nowadays Government boats carry up to 49 tons, and private boats as much as 800 bags weighing 113 tons.

Pound-lock gates later went largely out of use in China, owing to social changes. The Mongols shifted the capital to Peking, making it impossible for the whole of the imperial grain tribute to be transported by canal. Much of the transport of grain was shifted to the sea routes – sometimes more than half of the entire annual grain supplies. As time went on, the need for large barges on the canals diminished, a larger number of smaller vessels came into use, and the pound-locks were allowed to fall into disrepair and eventual decay. By the time the Chinese pound-lock found its way to Europe, it was on the wane in its country of origin, and the fact that it came from China was increasingly easy for not only Europeans but for the Chinese themselves to forget.



LEFT 15th A photograph taken by Cecil Beaton during the Second World War showing two Chinese sampans in a modern pound-lock. The pound lock was invented by Ch'iao Wei-Yo in 984 AD, but the first European one was not constructed until 1373.

Versluisje in Holland at a point where the canal from Utrecht joined the Rijn Lek. Shortly afterwards another was built at Spaarndam. The idea must have been brought from China to Holland by Dutch traders.

# Part 10

## SOUND AND MUSIC

### THE LARGE TUNED BELL SIXTH CENTURY B.C.

The large tuned bell, which was used for the most important religious and secular occasions, was the largest and most important of the bells. It was made of bronze and was used for the most important occasions. The bell was made of bronze and was used for the most important occasions. The bell was made of bronze and was used for the most important occasions.

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The ancient kings made up their minds that the bell should be made of bronze and that its weight should be 120 catties. The measurement of pitch, length, capacity, and weight originates in this standard vessel.

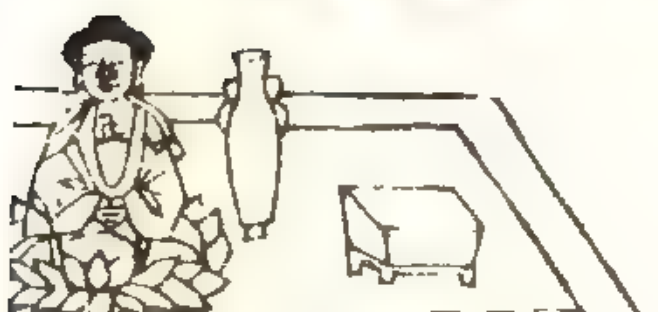
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坐理伏



經部藏書



At first the bells did not have clappers and had to be struck to give out their notes. Chinese clapperless bells date from about the sixth century BC. These would have been struck to give the note which would then be the keynote of the musical scale for an orchestra. In music, ancient Chinese bells seem to have been used to stop and start performances, rather than as actual instruments. They essentially served as ancient tuning-forks.

One of the extraordinary features of most ancient Chinese bells is that they were constructed so as to give out not only one note, but two. If struck in the centre, they would give out one note and if struck to one side, not at the edge, they would give out another. The intervals between the notes included major and minor seconds, thirds and fourths, and minor sixth.

After some time, the set of twelve bells came often to be replaced by a set of twelve pitch-pipes, which served the same purpose and were much easier to construct. Using pitch-pipes, it was also possible to extend the pitch range in capacity and volume. The bells had always given measures of grain, having, after all, originated as grain measures. But now pitch-pipes were closely studied and the precise number of grains of millet which would fit into them were counted. An imperial history for the first century BC reveals how "The basis of the linear measure is the length of the *Huang-chung* pitch-pipe [which gave the fundamental note]. Using grains of medium-sized black millet the length of *Huang-chung* is 10 *fen*, one *fen* being equal to the width of a grain of millet. Using grains of medium-sized millet, twelve

hundred grains fit its tube. The contents of one *Huang-chung* tube, i.e. twelve hundred grains, is called *chi* and weighs 12 *li* [half an ounce].

As Needham has remarked, this was a clever system. Although millet-grains might vary individually, when large numbers of one given species were used a fairly consistent average would be struck (large and small grains aberrant in size being rejected). This method of ensuring against the loss of standard measures was probably as practical as any that could have been devised.

The achievement of the ancient Chinese with regard to bells was a truly remarkable feat of early technology. Even today, the proper tuning of bells is considered difficult and highly intricate. To manufacture a bell giving

below 5. The largest set of ancient Chinese bells ever found in China was excavated in 1978 at Suixi, Hubei, in northern Hubei province from the tomb of Marquis Yi of the State of Chu, who was buried in the late fifth century BC. Sixty-four bronze bells, each

weighing from 15 to 300 pounds, were found. The bells were arranged in two rows of thirty-two each, and stood on four bronze stands. The bases and warrior figures on which the supports together weighed 10 pounds. The largest of the bells alone weighs over 100 pounds. It is believed that five performers were needed to play the set. As for the notes of the bells, forty-seven of them produce two notes with minor third intervals, and sixteen produce two notes with major third

intervals. The bells are arranged in two rows of thirty-two each, and stand on four bronze stands. The bases and warrior figures on which the supports together weighed 10 pounds. The largest of the bells alone weighs over 100 pounds. It is believed that five performers were needed to play the set. As for the notes of the bells, forty-seven of them produce two notes with minor third intervals, and sixteen produce two notes with major third



R. CHIT 1533A and bell, see notes

was able to give appropriate musical notes

which are still used in the temple of the

rock on the side of the ridge of the

its are generally about 8 feet high and

are made of bronze. However, as far

as 100 AD no bell more than 2 feet

in diameter has been seen or heard in Europe

where the material is thus essential

at the time of the first century

and Augustus in the last century

out a particular sound, one must consider the proportion of length to diameter, the elasticity and thickness of the material, the specific gravity, the diameters at different points, the contours of the curves, the temperature at which the alloy stands when it is poured, the rate at which it cools, and so on. Even when all these things are considered, the resulting sound said may not be perfect. It is common to have to file bells down in places in order to improve their sounds. Apparently, few ancient Chinese bells show signs of filing. Such was the mastery of bronze and iron casting of the ancient Chinese that perfect bells were produced at the first attempt.

As late as the year 1000 AD no bell more than 2 feet high had been seen or heard in Europe. But a cast iron bell precisely dated to 979 still exists at Ping-tung in Shansi in China, which is four or five times this size. Chinese bronze bells have been excavated which date back to at least the fourteenth century BC. While bells of the sixth century BC were just under 2 feet high, no bell higher than 8 inches seems to be known from any ancient Western civilization.



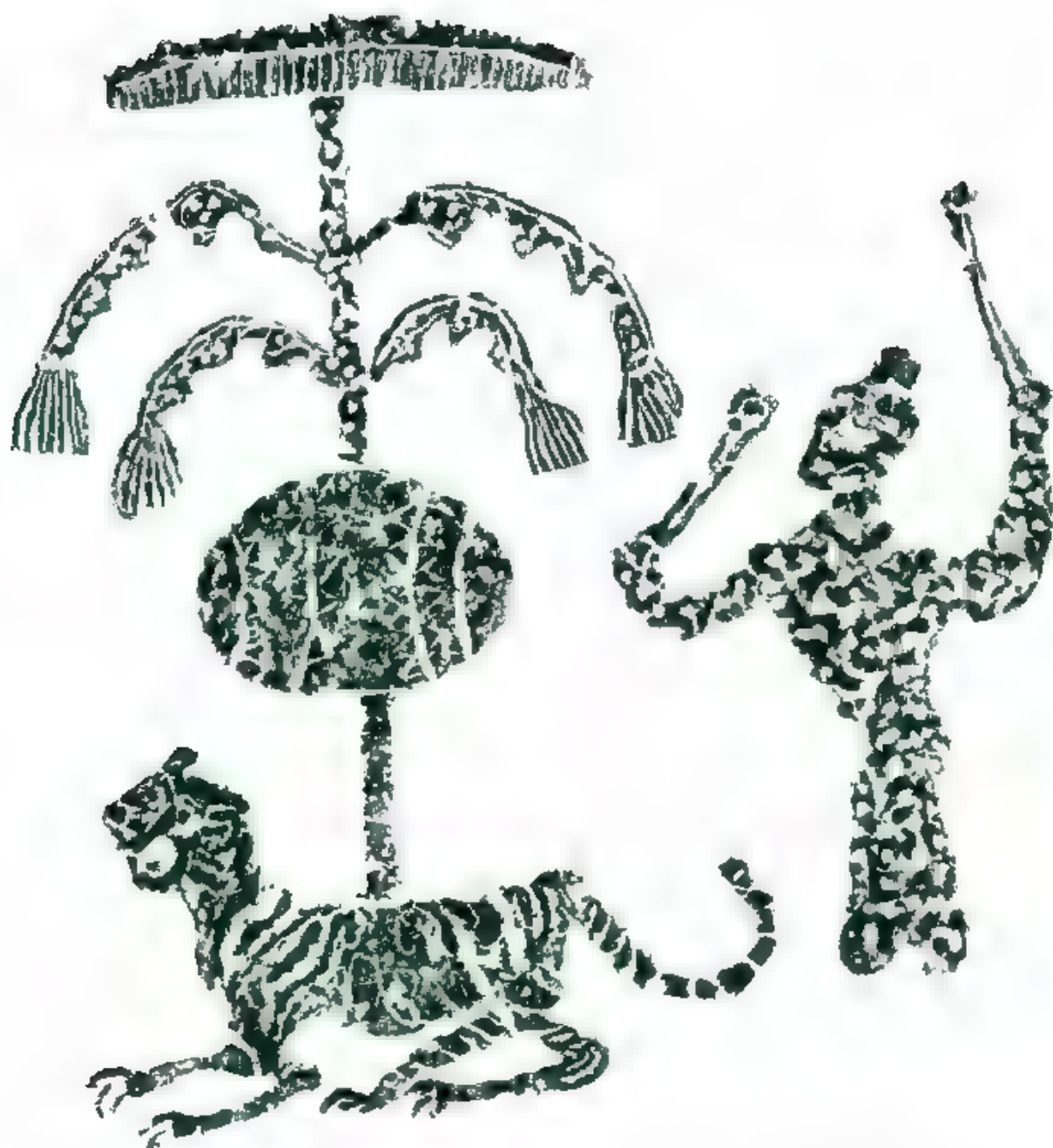
## TUNED DRUMS

Drums have existed from time immemorial and are common among most tribal peoples. But the tribal drums are not tuned. The Chinese appear to have been the first to develop tuned drums. For this they used stretched leather hides, and they were doing so by the second century BC at the latest. An ancient treatise on drums survives entitled *Chieh Ku Lu* ("On the History and Use of Drums") written by Nan Chiao in the year 848 AD, but it has not yet been studied by any scholar.

In the most ancient Chinese music a prime concern was the regulating of ritual dances and games, which by sympathetic magic were thought







say point in the form of a . . . This is a . . .  
 dream . . . of . . .

Needless to say, the . . . To explain the . . .  
 sight . . . at the left of the . . . strike . . .  
 . . . in the . . . just . . . strike . . .  
 at . . . that . . . the . . .  
 Nevertheless, the . . . of a . . .  
 which . . . of . . .

Tan Chuan-an interpreted a . . . say the  
 possibility of sound implication for . . .  
 the . . . saying that under . . .

Admittedly, a . . .  
 . . .  
 . . .  
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in . . . the . . .  
 . . . would be . . .  
 . . . of . . .  
 . . . the truth . . .  
 . . . rather remarkable . . .





AD 1911 Large tuned drums hang suspended in a monastery temple, ornamented with swirling patterns based upon the Taoist symbol of The origin of the Elements (Taiji). Copy: Monastery of the Sakya school's Tibetan Buddhist, a form of Buddhism especially popular with the Manchu emperors of the Qing Dynasty in Northern Province.

## HERMETICALLY SEALED RESEARCH LABORATORIES

The Chinese preoccupation with musical pitch led to what is probably the strangest of all the proto-scientific activities of the ancient Chinese. There is possibly no more bizarre story in China's history than how the world's first attempt at a hermetically sealed research laboratory came about and what the rationale – or rather rationale – behind this endeavour was.

In order to explain this properly, we have to understand the concept of *ch'i*, a word which is essentially untranslatable. Various meanings of *ch'i* may be conveyed by the following English words: subtle matter, matter-energy, emanation, ether, subtle fluid, rarefied air, aëria or atmospheric disturbance or perturbation, subtle pervasive force, material emanation (such as the 'earthly *ch'i*' which rose from the Earth), energy present in organized form. The Greek word *pneuma* bears some resemblance in its meaning to the Chinese concept of *ch'i*. Similarly, certain mystical uses of the Greek word *logos*, 'word', resemble the meaning of *ch'i*, as in the Bible where *logos* refers to Christ in the sentence 'The Word was made flesh, and dwelt among us,' in the Gospel of St John.

All living beings inherently possess *ch'i*, in addition to their other properties. The Taoists even developed a highly elaborate theory and practice for 'circulating the *ch'i*' throughout the human body which was related to concepts of acupuncture, and was the basis of health and longevity. In the human body, there were particular forms of *ch'i*; there was, for instance, the *ch'i* of the blood.

It would be possible to continue at great length, but this is sufficient to show that the concept of *ch'i* was fundamental to the ancient Chinese understanding of nature, life and the cosmos. Different forms of *ch'i* were conceived of as emanating from just about everyone and everything. If a person influenced another, his *ch'i* was predominant. Intimately associated with concepts of *ch'i* were the phenomena of pitch, timbre and resonance. Armies were conceived of as having a peculiar group-*ch'i*, which was thought of as an energy field floating over their heads and was sometimes visible as a cloud or haze as they marched into battle. There were no strict cut-off points or boundaries between the spiritual *ch'i* and physical matter: to the ancient Chinese, not only did the two

overlap, they intermingled, which gave explanations for countless natural phenomena.

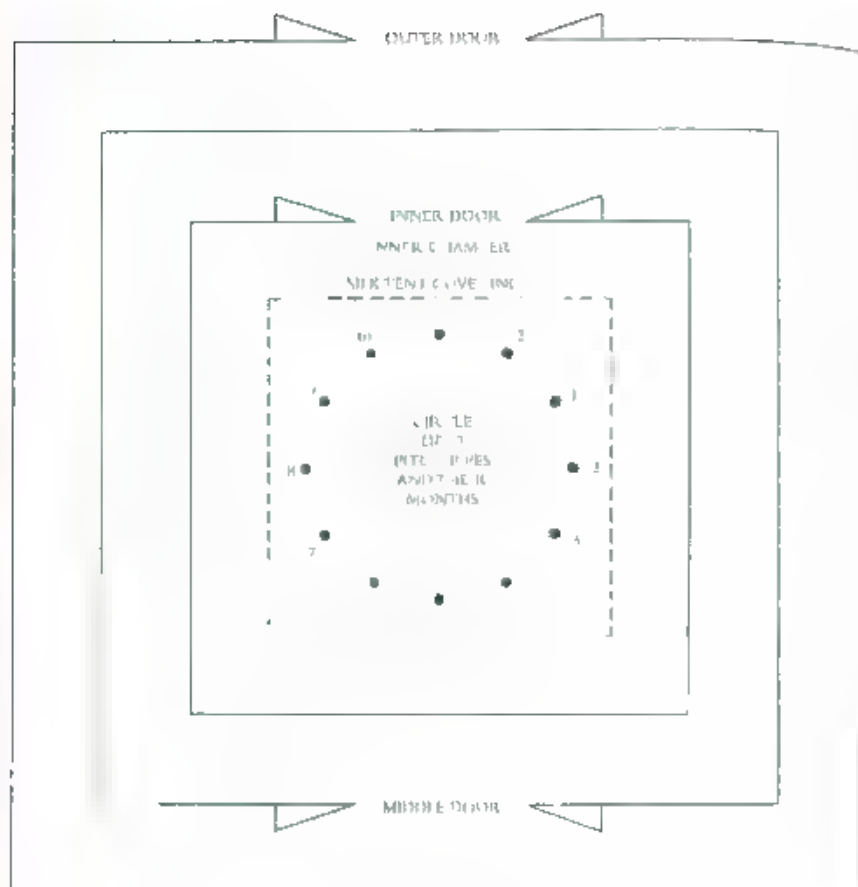
To detect the nature of the group-*ch'i* of an army, a kind of musical shaman would blow on special pitch pipes, and from the character of the resulting sound would pronounce his conclusions. A note which was weak and did not have sufficient timbre would indicate a weak and vacillating *ch'i*, and would thus foretell defeat or disaster for the army concerned. Pitch-pipe soundings by shamans were taken for the 'home' army upon its marching off on campaign, and for the opposing army as it stood arrayed for battle in the distance. Sometimes depending on the musical enquiries of the shaman, a battle would be called off, a retreat ordered, or an immediate attack launched. Music, therefore, was a serious business upon which tens of thousands of lives regularly depended.

The Chinese preoccupation with matters of pitch and timbre became a full-fledged obsession. A dreadful anxiety persisted that somehow the true fundamental pitches might become altered in passage of time or through the loss of certain bells and pipes during civil and military disturbances (which were so frequent throughout China's history), so a custom was instituted to safeguard the pitches which was one of the strangest rituals in his story. In order to introduce this peculiar tale, a fairly lengthy quotation from the ancient Taoist book of the philosopher Chuang Tzu (c. 290 BC) sets the scene:

'The breath of the Universe', said Tzu-Ch'i, 'is called wind. At times it is inactive. But when it rises, then from a myriad apertures there issues its excited noise. Have you never listened to its deafening roar? On a bluff in a mountain forest, in the huge trees, 100 spans round, the apertures and orifices are like nostrils, mouths or ears, like beam-sockets, cups, mortars, or pools and puddles. And the wind goes rushing through them, like swirling torrents or singing arrows, bellowing, sousing, trilling, wailing, roaring, purling, whistling in front and echoing behind, now soft with the cool breeze, now shrill with the whirlwind, till the tempest and the apertures are all empty and still. Have you never observed how the trees and branches shake and quiver, twist and twirl?'

Tzu-Yu said, 'The notes of Earth then are simply those which come from its myriad apertures, and the notes of man may be compared





LEFT FIG. 7) A diagram by Professor Dirk Bouke of one of the internationally sealed research laboratories used for the first time in research work for blowing of the ashes under the influence of imaginary earth forces in order to protect the interior from any possible light and/or other influences.

of urbanized corridors have resembling a modern photographic darkness. One came in by the outer door, walked to the far end of the structure to enter the middle door and walked to the other end to enter the inner door. There were no windows in the corridors which were thus protected coverings.

to those which issue from tubes of bamboo – allow me to ask about the notes of heaven?’

Tzu-Ch'i replied, 'When the wind blows, the sounds from the myriad apertures are each different, and its cessation makes them stop of themselves. Both these things arise from themselves – what other agency could there be exciting them?’

This early passage shows us with poetic fullness the way in which all of nature was conceived of as emitting musical notes analogous to those of the pitch-pipes. It will help us to understand how the following strange procedure was instituted, and how such a thing could possibly occur to any sensible human being.

In order to verify the correct lengths of the standard pitch pipes, and thus confirm the pitches emitted by them, which formed the basis for all measurement, by the first century BC the procedure known as 'observing the *ch'i*' or the blowing of the ashes, was instituted. As Needham says: Some ancient

nature-philosophers set out to trap the *ch'i* – which rose up from the earth combining with the *ch'i* which descended from heaven to produce the different types of wind that blew at different seasons of the year.

There were, as we have seen previously, twelve basic pitches, and a set of twelve standard pitch-pipes to emit them. But since there were twelve months, the Chinese, who loved to correlate things, assigned one pitch-pipe to each month of the year. As the official history of the first century BC tells us: 'The *ch'i* of heaven and earth combine and produce wind. The windy *ch'i* of heaven and earth correct the twelve pitch fixations. How did they do this?’

An obscure author known as 'Humble Tsan', whose real name is thought to be Yu Tsan, He Tsan or Fu Tsan, writing at some date prior to the end of the fourth century AD, gives the traditional explanation. The *ch'i* associated with wind being correct, the *ch'i* for each of the twelve months causes a sympathetic reaction in the pitch-pipes: the pitch-pipes related serially to the months never go astray in their serial order.

This makes clear that experimental standard pitch-pipes, twelve in number, were somehow 'activated' by subtle *chi* forces month by month, the appropriate pitch-pipe being 'activated' in its corresponding month. But what was the technique for accomplishing this, and how was the experiment set up? Ts'a Yung (c. 178 AD) gives the details.

The standard practice is to make a single-roomed building with three layers [concentric draught proof walls]. The doors can be closed and barred off from the world outside, and the walls are carefully plastered so as to leave no cracks. In the inner chamber curtains of orange-coloured silk are spread out forming a tent over the pitch-pipes, and certain stands are made out of wood. Each pitch-pipe has its own particular stand, set slanting so that the inner side is low and the outer side high, all the pipes being arranged round the circle of compass-points in their proper corresponding positions. The upper ends of the pitch-pipes are stuffed with the ashes of reeds, and a watch kept upon them according to the calendar. When the emanation [*chi*'] for a given month arrives, the ashes of the appropriate pitch-pipe fly out and the tube is cleared.

The official history for the first and second centuries AD adds:

They rely on calendrical calculation and so await the coming of the emanation [*chi*'], when it arrives the ashes are dispelled, that it is the emanation [*chi*'] which does this is shown by the fact that its ashes are scattered. If blown by human breath or ordinary wind its ashes would remain together.

Thus do we see the full lunacy of the 'observing the *chi*!'. This procedure was practised for at least 1700 years from the first century BC or earlier, up to the sixteenth century AD, when it was finally discredited as ridiculous. As Needham says: 'We are tempted to feel that there must have been some genuine natural phenomenon, even if only once observed, which sufficed to keep this strange technique living for a dozen centuries. However that may be, no rational basis for the system can be suggested.'

But as a by-product of the obsessive need to take precautions to safeguard the correct 'observation' of the *chi* and its effects on the pitch-pipes (which in the palace were all made of jade), we find that there arose what was genuinely the world's first attempt at a hermetically sealed research laboratory. Needham has summarized the matter thus:

The most interesting part of this strange experiment is the care which seems to have been taken to ensure that no ordinary wind could enter the sealed chamber. This sealing is perhaps really the most significant technical feature of the whole story. The precautions against chance breaths of wind and other disturbances reached their greatest degree of elaboration by the middle of the sixth century AD. Besides the tent of orange silk, gauze covers were fitted for each pitch-pipe individually. According to the descriptions, the stands or holders for the pipes were rather like our retort-stands. And the walls were so arranged that the doors of the inner and outer walls were at the south, while the door of the middle wall was at the north. Thus there were unbricated corridors exactly as in modern photographic dark-room practice. These remarkable details of the pursuit of an essentially unreal phenomenon may be found in the commentary of the Yueh Liang written by Hsiung An-Sheng about 570 AD, and in the *Yü Shü Chü T'u Fa* (*Commentary and Illustrations for the Book of Acoustics and Music*), due to the eminent mathematician and astronomer Hsintu Fang, his older contemporary.

Never until modern times can such elaborate procedures have been adopted, foreshadowing as they did the modern hermetically sealed research laboratory, as in the pursuit of the fantastic illusion of the supposed blowing of the ashes in ancient China an imaginary phenomenon of imaginary forces. It all goes to show that in the pursuit of the most irrational aims, the most rational of means may be developed and adopted.

Before leaving this bizarre subject, it is perhaps worth while taking note of some attempts to explain it made by Chinese skeptics of the sixteenth century. These have been studied by Professor Derk Bodde, who in his essay on the subject speaks of watching





musical instrument in any culture which has no frets and actually marks the nodes of vibration on the board' The very fact that there can be such a thing as a stringed instrument whose only musical purpose is the production of timbre variations is astonishing in itself.

The point of this instrument was that the strings were not played in such a way as ever to change their pitch, as happens when a string is pressed onto a fret in other instruments, such as the guitar or the violin. The *ch'u* was played with each string remaining at the same pitch at all times, and the art of playing was the production of different timbres of each string at constant pitch. This is so subtle that many Westerners might balk and question whether the result would strictly be music at all. But it is in fact a wonderfully rich and satisfying music.

The strings of the *ch'u* are all of silk. The traditional manner of playing them involved more than twenty-six different 'touches' or means of plucking or stroking them, for vibrato alone. R. H. van Gulik describes one vibrato technique in *The Lore of the Chinese Lute* published in 1940, as follows.

Remarkable is the *ting yin*, where the vacillating movement of the finger should be so subtle as to be hardly noticeable. Some handbooks say that one should not move the finger at all, but let the timbre be influenced by the pulsation of the blood in the fingertip, pressing the string down on the board a little more fully and heavily than usual.

Needham comments on 'the infinite subtlety with which any given note could be played, and remarks: 'Indeed, even today an expert *ch'u* player will himself remain intently listening long after a note has become inaudible to other listeners. As Taoist thought put it (in the Book of Lao Tzu) "The greatest music has the most tenuous notes."

The subtleties of the *ch'u* caused it to appeal to the Chinese literati who ended by monopolizing it. At first it was the only musical instrument which a gentleman considered worthy of his playing. Then so fashionable did it become that every educated man thought it best to have one hanging on his wall, whether he used it or not. And finally, only gentlemen were supposed to play the *ch'u*. This led to a decline in musical standards since the educated classes naively believed that the

qualification for playing the instrument was not musical ability or skill, but whether one knew classical literature and poetry and were 'refined'. One direct result was that *ch'u* music became less musical, and was less employed for accompanying singing. The emphasis shifted to the production of the different sorts of timbre for their own sake, rather than as part of musical compositions. Literati would sit and listen to series of subtle timbre variations almost without melodic line. So little did melody matter that the great compilation of *ch'u* music containing 468 tunes was actually lost, at the very time when the numbers of instruments was increasing dramatically. But whereas the musicality declined, the scientific understanding of timbre increased. The adoption of this instrument by the literati therefore both preserved the instrument into an era (the seventeenth century onwards) when it might otherwise have become extinct like the Great Lute, and at the same time advanced musical theory considerably.

The playing of the *ch'u* obviously required a musical notation different from usual. Musical notation for this instrument took the form of instructions, not only on which strings were to be used, note by note, but on the 'touch' by which the fingers were to play each note. Many pieces of music for this instrument also survive which additionally indicate that the rising or falling intonation of the words sung by the singer were to be accompanied by the zither, the change in voice intonation was matched by the variations in timbre of the instrument – a particularly subtle musical technique.

Chinese understanding of the nature of sound as vibration was much increased by studying the production of timbre on the strings of the *ch'u*. When a string vibrates, a wave is manifested in the string, and there are points called 'nodes' where the string remains stationary. Players of the *ch'u* would have become aware that touching a vibrating string at a node has no effect on the vibration, but touching it anywhere else causes the vibration to cease. And the many 'touches' used in playing the *ch'u* exploited these phenomena to the full in the manipulation of timbre. Since timbre is the sum total of the fundamental note and its higher harmonics, which are of varying consonance and dissonance, the elimination of various of the overtones while leaving others could have a substantial effect.



We can reproduce the essentials of *ch'in* playing on common stringed instruments, and skilled violinists often do this. But if we turn to the piano, let us play the note middle C (f while the string vibrates, we then touch it precisely in the mid-point, we silence the fundamental tone (the note itself) as well as the overtones G of the next octave and E of the octave above that. But the two C notes at one and two octaves removed from the original will continue to sound from the touched string, as will the note G three octaves up.

We can thus select out' various overtones and higher harmonics, while leaving others. This is a manipulation of the timbre of a single string such as was practised with elaborate and manifold skill by the *ch'in* players. And in the study and manipulation of timbre, the stretched string, with its utter precision, is the perfect medium. For its higher harmonics are described by simple numerical relations. These overtones theoretically continue to infinity: indeed, in that triumph of resonance, the modern piano, no less than forty-two overtones have been recorded and detected from the vibration of a single string.

The silken strings of the *ch'in* could not be subjected to sufficient tension to be capable of such enormous feats, but they did very well, for silk is extremely strong, and the strings were made of intertwined silken threads sometimes numbering seventy or eighty per string.

The understanding of timbre, overtones and higher harmonics meant that the Chinese were able to contemplate those phenomena of consonance and dissonance which eventually led them to invent the equally tempered musical scales (described in the next account), which most musicians believe to have been invented in the West. One incentive to invent the equal temperament of scales is to avoid certain sounds regarded as dissonant, and knowledge and appreciation of such dissonances partially comes from understanding timbre. For instance, in a vibrating string, the overtones represented mathematically by odd numbers occurring above the fifth are generally considered dissonant sounds to the fundamental note.

The observations of vibration of stretched strings in China were scientifically just about as advanced by the third century AD (when we know for certain that the techniques of the *ch'in* had reached a refined stage) as they were by the nineteenth century in Europe.

## EQUAL TEMPERAMENT IN MUSIC

INTRODUCTION

The inventor of equal temperament in music was Chu Tsai-Yü, who published his invention in 1584. The first mention of Chu Tsai-Yü's invention was in the unpublished papers of the great mathematician Simon Stevin (died 1620). Chu Tsai-Yü was born in 1536, a prince of the Ming Dynasty. But he turned his back on his princely rank and concentrated instead on studying music, mathematics and the science of the calendar. His system of equal temperament appeared in his book *A New Account of the Science of the Pipe-Pipes*, published in 1584. The Chinese did not pay much attention to the new system, but the Europeans quickly saw its advantages.

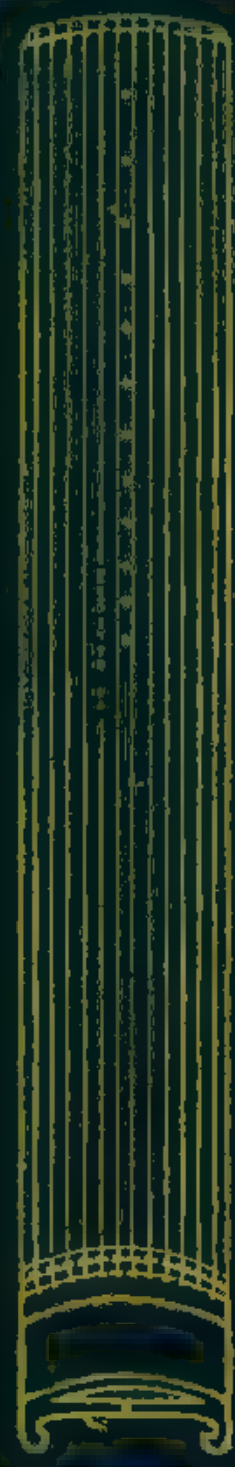
Two years earlier the great Chinese scholar of the Jesuits, Matteo Ricci, commenced his studies at Macao. From 1580 the Viceroy of the Cantonese province had established biannual 'radio fairs' lasting several weeks, at which Chinese and Westerners exchanged ideas and goods. The interchange between East and West was intense just at the moment when Chu Tsai-Yü went into print with his new theory. It is a case of perfect timing which gives one the feeling that it was 'fated' to happen. We do not know the exact mode of transmission of the idea to Europe, there can be no doubt that Western music was to be totally conquered by the Ming prince, for within 52 years of Chu's publication his ideas were published by Pierre Marin Mersenne. The Ming Dynasty ended eight years later, but Ming music today blares from every transistor radio in the world.

The first published reference to the mathematical basis for equal temperament in Europe was by Mersenne in one of his many books of musical theory, entitled *Harmonie Universelle*, issued in 1636. Werkmeister later popularized equal temperament, and Johann Sebastian Bach took up the cudgels on its behalf by composing a series of pieces, collectively entitled *Das Wohltemperirte Clavier* (*The Well-Tempered Clavier*), consisting of 'preludes and fugues' in all the tones and semitones — for the use and practice of young musicians who desire to earn, as we say by way of amusement, for those who are already skilled in this study.

This epochal work was published in 1722. Yet probably only a few of all those who have ever listened to or played these pieces have had any idea of



新製律準



正面小樣

新製律準



背面小樣



Bach's underlying intentions. The *Well-Tempered Clavier* was a work of propaganda. Bach had adopted equal temperament with a passion later to be matched by that of his fellow-composer Giuseppe Tartini's opposition to it. Equal temperament allows one to modulate fluently from key to key consecutively in the composition and performance of music. It was passionately adopted by those who thought the practical advantages of this were paramount, and was as passionately opposed by those who thought that purity of tone and other substantial factors should not be sacrificed to such base utility. These frenzied debates and disagreements have died down now in the West, at least for the moment. Equal temperament, so hugely aided by the prestige of Bach, triumphed utterly during the nineteenth century, yet many of today's musical experts do not really understand its principles, and no more than a handful of Westerners can now appreciate what music would sound like without it.

The only way for the reader to appreciate the magnitude of this subject is for us to consider the underlying problem which makes perfection of tone in all musical composition impossible. It is one of the most fascinating but least known of the fundamental enigmas of the Universe. There is no music conceivable on whatever planet, in whatever galaxy, where the dilemma could be escaped.

Let us illustrate the matter in a simple way by discussing a piano. Most people know that a note struck simultaneously with a note eight notes higher (in a scale) is an 'octave'. The low note and the high note are the same (say a C), except that the high note is 'C an octave higher than the lower C'. The higher one is double the frequency of the lower one. This is true whatever note is played: an 'octave' is defined as a note of a particular frequency sounded with a note of twice that frequency. Octaves are quite simple. They are also rather boring, because the same notes sounded an octave apart have no variety. There is neither consonance nor dissonance, there is just

uniformity. An octave is like a man standing and staring at a photograph of himself which he holds in his hand: a simple double image. How much more interesting it would be if the man were to stand with his arm around a woman whom he loves, or were to be scowling at one whom he hates. The first would be a consonance, and the second would be a dissonance. The interest of life is in variety and juxtaposition: hence, a C played with any other note than another C takes on greater interest to us than the octave.

The most pleasing consonance of two notes sounded together is what is called a 'fifth'. This is not simply subjective; an analysis of the sound waves involved shows that the higher harmonics of the notes have consonant beats with one another. But there does remain a mystery about the preference human beings find for harmony and the annoyance they experience upon hearing dissonance. Sir James Jeans has written 'It must be admitted, however, that [there] is a defect of most theories of discord. Innumerable theories are ready to tell us the origin of the annoyance we feel on hearing a discord, but none even attempts to tell us the origin of the pleasure we feel on hearing harmony, indeed, ridiculous though it may seem, this latter remains one of the unsolved problems of music.'

What, then, is this most pleasing and harmonic of all joint sounds, the fifth? For it was the fifth rather than the octave which was the basis for Chinese music. A typical example would be the chord CG. If you then play successive fifths, using the top note of one fifth as the bottom note of a new fifth, you do not come to a C again for quite some time (CCDAEBF#C#AbE<sup>b</sup>BbFC). In fact, you have a succession of twelve fifths before reaching another

Musical theorists like to speak of the ascending fifths as a 'spiral of fifths', and they draw them in a diagram spiraling upwards. If you count the number of octaves between the first and last note in a spiral of twelve fifths, you will find that there are seven. As the spiral has gone round, it has repeatedly missed the higher octave notes of the original note, until finally after twelve fifths it hits the seventh octave of the original note. Then and only then do the two separate ascending series meet.

An upward (or downward) spiral of fifths and an upward (or downward) spiral of octaves thus only meet up when twelve fifths and seven octaves end on the same note. Until then, on their upward or downward courses, the two means of proceeding

OPPOSITE 16 Prince Chu Tzu Yu invented equal temperament in music. He published the idea in 584 in his *New Account of the Sounds of the Pitch Pipes*. This woodcut of his personal ruling instrument is from the book in which he proudly stated: 'I have founded a new system.' Little could he have realized that his system would be universally adopted in the West. Johann Sebastian Bach was its leading promoter.

RIGHT (162) A Sui Dynasty  
(581-618 AD) figurine of a girl  
playing the *huo suor jue*, which  
was introduced into China in the  
second century AD from Central  
Asia. This instrument was a  
favourite in *Chia*, and is frequently  
mentioned in literature and poetry.



have been quite separate. It is as if two runners were running the same distance on two separate tracks which went over and under one another repeatedly until they reached the same finishing post at a point where the separate tracks met for the first time since the start.

This is important, for upon examining this more closely we find that it is not as simple as it seems - there is something curiously wrong. The problem is this: musical tones are very precisely measurable in the laboratory, and an exact number is assigned to every note as its frequency. Now, when one plays a C seven octaves higher than another C, we find that its frequency is 128 times that of the original. (Every octave doubles the frequency, and if you progressively double so nothing seven times you have in fact made it 128 times its original self.) But if you want to have a sequence of fifths which increase by 1.5 times the original frequency (which is what fifths do) twelve times over you will achieve a final result not exactly equal to the 128 of seven octaves but equal instead to the slightly different amount of 129.75, which is the value of  $(1.5)^{12}$ .

The fact is that the mathematics of the fifth is incommensurable with the mathematics of the octave. A note which is a fifth higher than another note has a measurable frequency one-and-a-half times that of the lower note. And the number 1.5 is arithmetically incommensurable with the number 2 (which expresses the doubling of the frequency of a note when raised an octave.) So the fifth and the octave are out of joint with each other on fundamental arithmetical grounds. The spiral of fifths comes to a stop at a point which is 1.0136 times the sequence of octaves. (Or, the frequency 129.75 is 1.0136th that of 128.) This value, 1.0136, is known as 'the comma of Pythagoras' after the Greek philosopher who discussed it.

The different keys are established in Chinese music by the twelve different notes of the spiral of fifths, and these twelve notes are all found within the compass of a single fundamental octave. The spiral of fifths ascends from C to G to D to A to E to B to F# to C# to A# to E# to B# to F back to C (except, as just mentioned, this C is not absolutely precise). It will be appreciated that all of these notes fall between one C and the higher or lower C, and give the twelve keys. These twelve

notes also give the complete chromatic scale of modern music.

Equal temperament is an artificial system created to get round the fact that the spiral of fifths ends on a note slightly off the end of the sequence of octaves. The tiny fraction of 0.0136 is divided into twelve equal parts, and each part is subtracted from one of the twelve notes into which an octave is divided. This means that the gap between a note and its fifth is no longer precisely 1.5 but is instead a tiny fraction less, namely 1.4983. This 'violence done to all the fifths' squeezes them into the inner space of a pure octave. All twelve steps in the octave are now precisely equal, and are called semitones. In order to accomplish this, each fifth has been artificially but evenly rendered flat by about one forty-eighth of a semitone. All equally tempered music is thus uniformly and unremotely 'flat'. But it provides a regular and reliable structure so that one can modulate from key to key for as much richness and variety of composition as one could desire.

This is not to say that much has not been lost sacrificed on the altar of utility. Our modern ears have been so debased by hearing only equally tempered music that we no longer know a pure tone. We send for a piano tuner to tune our piano, but in fact he comes and tunes it flat, note by note, as relentlessly as ants march forth from their nest. We are thus subjected, from birth to death, to nothing but flat notes. We never so much as hear a pure tone.

Before equal temperament, in both China and the West, there were various 'modes' of untempered music. For the sake of simplicity, we can speak as well of the ancient Greek ones, which have less difficult names though they all have Chinese equivalents. There were the Ionian, Dorian, Phrygian, Lydian, Mixo-Lydian, Aeolian and Locrian modes. Instruments could be tuned to only one mode at a time. Some of the modes were happy and carefree, while others were sad and mournful. They represented a vast richness of emotional intensity and experience which has now completely and utterly vanished from the music known to us today. It is impossible to describe them: the colourations and subtleties of the differing modes were somewhat like the difference which we know between major and minor keys, multiplied several times. In the absence of these old modes, not a single person in the entire Western world unaffected by deafness can avoid hearing at every turn music fashioned from an imported Chinese theory.



# Part 11

## CHEMICAL WARFARE, POISON GAS, SMOKE BOMBS AND TEAR GAS

When there is an epidemic of a contagious disease, let the clothes of the sick person be collected as soon as possible after the onset of the illness and thoroughly steamed in this way the rest of the family will escape infection.





which were involved. Bizarre and terrible poisons were mixed together in a very large proportion of the bombs and grenades of the Chinese (for which, see page 256). One of the most disgusting must certainly have been the medieval excrement bomb, for which we have the recipe:

Ingredients	Weight in Ounces
Human excrement, dried, powdered and sifted very fine	240 (15 lb)
Wolfsbane	8
Aconite	8
Croton oil	8
Soap-bean pods (to create black smoke)	8
Arsenous oxide	8
Arsenic sulphide	8
Cantharides beetles ( <i>Mytalris cantharis</i> )	4
Ashes	16
Tung oil (from either <i>Aletris fordii</i> or <i>Persea torreyana</i> )	8
Total for one bomb	316 oz (19.75 lb)

This would have created a stink bomb spreading excrement dust combined with some pretty deadly poisons all over the enemy. All of the above ingredients were either surrounded by or combined with a gunpowder mixture, wrapped in layers of paper which were tied with hemp string and covered with melted resin. This deadly packet would be hurled by a piece of artillery called a trebuchet, which held the bomb on a sling which would be whipped up in the air on an arm. A lighted fuse would cause the bomb to ignite either over the heads of the enemy, or shortly after landing, when it would have burnt fiercely and spread its foul smoke in thick clouds.

Directions also survive as to how to mix poison bomb recipes. For instance, sulphur and saltpetre were pounded together and passed through a sieve. Arsenic and white lead would be ground together. Dried lacquer would be pounded separately into a powder (it was a powerful chemical irritant). Yellow wax, pine resin and various oils would be boiled together into a

paste and the powdered chemicals added to turn it into a thick soupy mass, constantly and carefully stirred. Smaller poison bombs with lighted fuses could be fired from bows or crossbows. In the fourth century BC the Mohists had burnt poisons in a furnace, drawn the deadly smoke off in pipes and blown it with bellows down tunnels constructed by the enemy. But by medieval times poison bombs were let down and exploded in the tunnels instead. Bamboo fans were used to drive smoke and flame down the tunnels to stifle and burn the enemy.

The equivalent of our modern tear gas was a blinding smoke created by bellows blowing out finely powdered lime, which made the eyes run profusely. Yang Wan-Li, in his book *Rhapsody On the Sea-set Paddle-Wheel Warships* describes a sea fight of 1161 where tear gas was used effectively.

In the Shao-Hsing reign-period, the rebels of Wanyen Liang came to the north bank of the River in force ... but our fleet was hidden. Then all of a sudden a thunderclap bomb was let off. It was made with paper carton and filled with lime and sulphur. Launched from trebuchets these thunderclap bombs came dropping down from the air, and upon meeting the water exploded with a noise like thunder, the sulphur bursting into flames. The carton case rebounded and broke, scattering the lime to form a smoky fog which blinded the eyes of men and horses so that they could see nothing. Our ships then went forward to attack theirs, and their men and horses were all drowned, so that they were utterly defeated.

We have better descriptions of these tear gas bombs in an account of the campaign of the Sung general Yo Fei against the band chief Yang Yao in 1135:

the army also made 'lime-bombs'. Very thin and brittle earthenware containers were filled with poisonous chemicals, powdered lime, and iron calthrops [sharp pointed objects to injure feet]. In combat they were used to assail the enemy's ships. The lime formed clouds of fog in the air, so that the rebel soldiers could not open their eyes. They wished to make the same kinds of things themselves, but their potters were not able to produce them, so they suffered great defeats.

Chinese tear gas was in fact in use by the second century AD at the latest. The dynastic history relates this suppression of a peasant revolt in the year 178:

The bandits were numerous, and Yang's forces very weak, so his men were filled with alarm and despondency. But he organized several horse-drawn vehicles carrying bellows to blow powdered lime strongly forth, he caused incendiary rags to be tied to the tails of a number of horses, and he prepared other vehicles full of bowmen and crossbowmen. The lime chariots went forward first, and as the bellows were plied the smoke was blown forwards according to the wind, then the rags were kindled and the frightened horses rushed forwards throwing the enemy lines into confusion, after which the bowmen and crossbowmen opened fire, and drums and gongs were sounded, and the terrified enemy was utterly destroyed and dispersed. Many were killed and wounded, and their commander beheaded.

Sometimes the recipes for poison bombs are positively gleeful at the hideous effects caused. One fourteenth-century bomb described in *The Fire-Drake Artillery Manual* of 1412 is the 'bee swarm bomb', producing a burning fire which 'comes forth (and) can stick to the enemy's person and soil burn.' The book adds dolefully that (unfortunately) 'it can be extinguished with water.' And from the same book we hear also of the 'flying-sand magic bomb releasing ten thousand fires'. It consisted of a tube of gunpowder put into an earthenware pot containing quick lime, resin, and alcoholic extracts of poisonous plants. It was thrown down from city walls, and its explosion released the deadly poisons.

Poisons, poisonous gases, and tear gas were not only delivered by bombs and grenades. They were fired from guns and proto-guns, as described elsewhere (page 266). An early proto-cannon in the fourteenth century was called the 'poison fog magic smoke eructor' and *The Fire-Drake Artillery Manual* recounts its amazing properties:

If blinding gunpowder, flying gunpowder, poison gunpowder, and spurring gunpowder are filled into a shell and fired at the top of a city wall, fire will break out and smoke will spread in all directions as the shell explodes. Enemy soldiers will get their faces and eyes burnt, and the smoke will attack their noses, mouths and eyes. If the right moment is chosen, no defenders can withstand such an attack.

Among the many sorts of gunpowder whose formulae are given by the early Chinese, several are specified as tear gas mixtures or poison gas producers. A classic tear gas mixture was called 'five-league fog'. It contained a mere 27.8 per cent saltpetre, the same amount of sulphur, and 44.3 per cent carbon. It must have burned slowly, and contained arsenic, sawdust, resin, human hair and chicken, wolf and human excrement. A poison gas bomb called 'soul-hunting fog' contained a very strong explosive with 83 per cent saltpetre, a mere 8.3 per cent sulphur, and 8.4 per cent carbon, together with arsenic sulphides and deadly animal poisons. These bombs are at the two extremes of slow burning and strongly explosive. Practically every animal, plant and mineral poison imaginable was combined in one or another mixture.



Fig. 147 (164). A medieval artillery piece, known as the 'heaven-crashing thunderclap flame fire erector', which fired poison smoke pellets at the enemy.

by the Chinese. There hardly seemed to be a deadly substance unknown to them.

They were also informed as to the various effects of the different poisons. A text of 1606 tells us that certain ones will 'cause the enemy's flesh to rot until the bone shows', whereas with dolphin oil, Szechuan varnish and arum poison the enemy will be struck dumb. It adds 'Smoke from burning wolf excrement, which looks red both in the daytime and on dark nights, can be used for sending warning signals'.

The development of rockets for warfare (see page 262) added a new method of delivering poisonous bombs. The 'free-flying enemy-pounding thunder crash bomb' used this method. When its rocket charge had exhausted itself the fuse was lit and the bomb fell releasing a poisonous and irritating smoke even though the bomb was only 5½ inches in diameter.

When did these deadly practices reach Europe? In 1540, Vannoccio Biringuccio in his book *Pirrotechnica* described typical Chinese formulae for use in fire-lances. They contained arsenic and the usual poisons. He remarked that when lighted, they sent out 'a very hot tongue of flame more than 2 or 3 yards long, full of explosions and horror'. Even earlier, Leonardo da Vinci had envisaged attacking the enemy with sulphurous smokes, fumes of burnt feathers, sulphur and arsenic, and even toad and tarantula venoms mixed with rabid saliva and conveyed by bombs. That was about 1500. And until 1580 arsenic was a great favourite in Europe. But it was replaced by mercury smoke balls in the seventeenth century. Such, then, is one of China's more baleful gifts to the world.

## THE CROSSBOW

For more than two millennia the crossbow was the standard weapon of Chinese armies. In fact, it was used by the Chinese as recently as 1895, by which time of course, it was largely ineffective against modern European guns. The crossbow was invented in China in its form as an actual weapon, but the original idea for it came from the primitive bow-trap used by aboriginal peoples to kill game. When a person holds an ordinary bow, he holds it vertically. In setting a bow-trap, however, the bow must be laid horizontal. Furthermore, a stick or long piece of wood must be placed against the bow, at the far end of which the bowstring is pulled taut. Then when an

animal comes along and knocks the trip-wire with its foot, the stick is pulled away and the bow fires its arrow at the animal, which is collected by the hunter later as he makes his rounds. Thus, the form of the crossbow was implicit in these primitive beginnings from earliest times.

It later appeared in Europe at two widely separated times; each transmission of the invention is thought to have been from China. Even in neighboring India though the bow-trap was commonly used in Bengal against tigers, the actual crossbow was only introduced for the first time by the Mogul conquerors of the Middle Ages.

A Chinese text compiled from earlier materials in the second century AD credits the invention of the crossbow to a Mr Ch'in of Ch'u, who was an archery student of Feng Meng. If Feng Meng really existed and was not just a mythical personage, then this date would be the seventh century BC. Unfortunately, we have too few texts from these early periods to be certain of such things. During the Han Dynasty, around the time of Christ, an archery manual by Feng Meng existed though it has since been lost. This may or may not have been the real name of the author and he may or may not have been the teacher of Mr Ch'in. This is what we are told about Mr Ch'in himself.

Mr Ch'in considered, however, that the bow and arrow was no longer sufficient to keep the world in obedience, for in his time all the feudal lords were fighting against one another with weapons, and could not be controlled by ordinary archery. He therefore added at right-angles to the bow a stock and established a trigger-mechanism within a box or housing, thus increasing its strength. In this way all the feudal lords could be subdued. Mr Ch'in transmitted his invention to the Three Lords of Ch'u ... and it was from them that Ling Wang [reigned 539-527 BC] got it. As he himself said, before their time the men of Ch'u had for several generations guarded their frontiers only with bows of peachwood and arrows of thorn.

There is additional evidence to indicate that the crossbow was indeed invented in the kingdom of Ch'u, and it would appear that Mr Ch'in may have been a real person who did indeed live in Ch'u in the century before Confucius. However, Needham suggests that what Mr Ch'in may really have invented



seconds. The muzzle is 10 inches long and the bolts. Three of the bolts are displayed beside the

about the eleventh century and were common by the year 1600 in China. They had an effective

of 700 yards. They provided the earliest form of

in Vietnam War (by shooting a spray of bullets

of almost wave attacks on soldiers. The

of this weapon is 39 inches, with the bolts

4 inches long. The gun Archer Foundation

Museum, Manchester, University of Manchester.



was a trigger-mechanism. An earlier form of the crossbow may already have existed. The earliest textual evidence of the crossbow is from a book called *Master Sun's Art of War*, which dates from at least 345 BC and is reputed to date from 498 BC. This book says that energy may be likened to the bending of a crossbow, decision to the 'releasing of the trigger'. The use of such an image can have had little point unless crossbows were sufficiently familiar to the reader for the statement to make sense.

By the fourth century BC the use of crossbows in battle is recorded by Sun Pin, a descendant of Master Sun, who wrote that 'A very strong body of crossbowmen' was decisive in a victory obtained in that century at the Battle of Ma Ling. Elsewhere, in 336 BC, the official Su Ch'ien was recorded as boasting that the Prince of Han has '10,000 suits of armour and the strongest bows and crossbows in the world'.

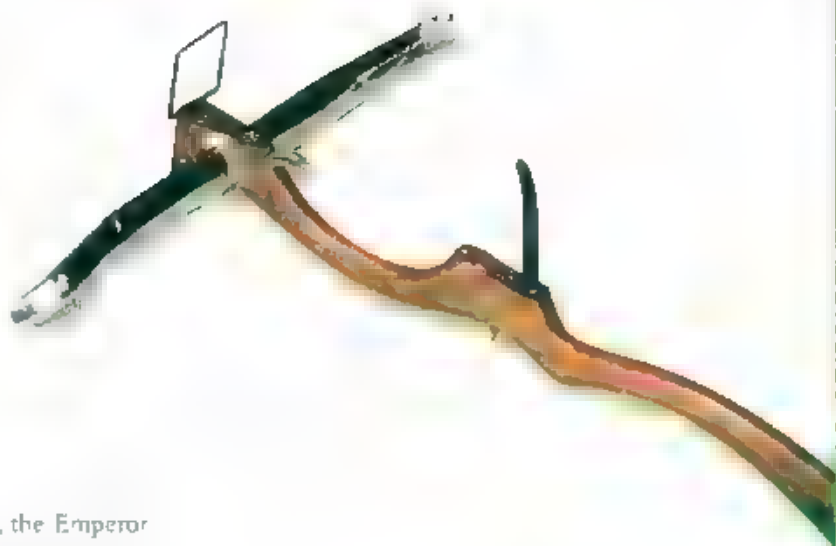
Dr E.M. Grosser has published a very detailed account of what may be the earliest surviving crossbow. It is a pistol-crossbow, to be held in the hand like a modern handgun. The design on top has been attributed, on stylistic grounds, to the early Chou Dynasty, which might place this excavated bronze pistol-crossbow in the eighth or ninth century BC, or even earlier. However, the earliest certain archeological evidence for crossbows are depictions of them on inland bronze vessels, which apparently date from the beginning of the fourth century BC. Further textual evidence from that century exists in the Mohist texts

on fortification engineering, in *The Book of Master Mo*, which speaks not only of ordinary crossbows but also of large multiple-bolt *araballistae* (crossbow-cannons used for sieges).

By the third century BC textual references to crossbows become abundant. *Master Lu's Spring and Autumn Annals* of 239 BC says: 'If the mechanism of a crossbow-trigger is out of alignment by no more than the size of a rice-grain, it will not work.' This is perfectly true. Indeed, the perfection of the bronze trigger mechanisms is the most impressive of the Chinese achievements in developing the crossbow. The trigger box was inset into the stock like a tenon into mortise and had a groove on its upper surface for the arrow or bolt. The trigger (called 'hanging knife' by the ancient Chinese, since that is what it resembled) hangs down below the housing case rather like that of a modern gun. Despite the lack of metal lathes, the earliest surviving trigger-mechanisms were manufactured to an incredible degree of machined accuracy, and even more impressive than their quality is the standardization that must have been required for their mass production. A crossbow trigger-mechanism is a complicated device which contains within its housing three moving pieces on two shafts, each finely cast in bronze and machined to a precision which is difficult to imagine.

In order to appreciate the feat of proto-industrialization which this represented, we must know something of the quantities of crossbows

**PLATE 60** A traditional Chinese crossbow thought to be of the nineteenth century. The stock is 33 inches long, constructed of wood, horn and sinew, with an array of rivets and small discs of ivory and painted paper underneath. The string is of gut. A sight is mounted on the front. See also Plate 61. *Foundations, Manchester Museum, University of Manchester*



which had to be produced. In 209 BC, the Emperor Erh Shih had crossbow regiments numbering 50,000 men and a similar number of crossbowmen also served under the emperor Wen Ti in 177 BC. But just to think that this meant that only a few tens of thousands of crossbows existed at this time, we are informed by China's great historian, Ssuma Ch'ien, that in about 157 BC the prince Liang Hsiao Wang was in charge of arsenals containing *several hundred thousand crossbows*. This means that twenty-one centuries ago, the Chinese were capable of mass-producing complicated mechanisms which were first cast, then machined to a fine standard, and then assembled, in numbers of approximately half a million.

Surely this massive arms production in ancient times is an industrial achievement of the first order. The scholar Homer Dubs observed that the Chinese crossbow trigger-mechanism 'was almost as complicated as that of a modern rifle bolt, and could only be reproduced by very competent mechanics'. So complex were the mechanisms that the Huns were unable to assemble them or copy them. Crossbow arrows were also useless because they were too short for use with a long bow. Therefore, both the weapon and its ammunition were 'capture-proof', in the sense that even if captured they were guaranteed to be useless to the enemy.

The Chinese well appreciated their own advantage in armaments. Here is what Tseng Kung-Liang said in his book *Collection of the Most Important Military Techniques* published in 1044:

The crossbow is the strongest weapon of China and what the four kinds of barbarians most fear and obey. The crossbow is the

most efficient weapon of any, even at distances as small as 5 feet. The crossbowmen are mustered in separate companies, and when they shoot, nothing can stand in front of them, no enemy formation can keep its order. If attacked by cavalry, the crossbowmen will be as solid as a mountain, shooting off such volleys that nothing can remain alive before them. Although the charge may be impetuous it will not reach them. Therefore the barbarians fear the crossbow. Truly for struggling around strategic points among mountains and rivers and defiles, overcoming men who do not lack bravery, the crossbow is indispensable.

Regarding the method of using the crossbow, it cannot be mixed up with hand-to-hand weapons, and it is most beneficial when shot from high ground facing downwards. It only needs to be used so that the men within the formation are loading while the men in the front line of the formation are shooting. As they come forward they use shields to protect their flanks. Thus each in their turn they draw their crossbows and come up, then as soon as they have shot their bolts they return again into the formation. Thus the sound of the crossbows is incessant and the enemy can hardly even flee. Therefore we have the following drill:

shooting rank  
advancing rank  
loading rank

Such praise of the crossbow was traditional in China. Twelve centuries earlier, a eulogy of the weapon was recorded in the imperial official history for 69 BC., part of which says:

the drill of crossbowmen alternately advancing to shoot and rearing to load, this is something which the Huns cannot even face. The troops with crossbows ride forward and shoot off their bolts in one direction, this is something which the leather armour and wooden shields of the Huns cannot resist. Then the horse-archers dismount and fight forward on foot with sword and bill, this is something which the Huns do not know how to do. Such are the merits of the Chinese.

Manufacture of crossbows was by division of labour. Most crossbow trigger-mechanisms which have been found have been inscribed by their makers, often giving dates. One was excavated in the eleventh century and examined by the writer Shen Kua. He wrote, *in* *infidly*, 'We never could find out what dynasty this crossbow mechanism belonged to', but it bore the inscription 'Stock by Yu Shih, rear work of the crossbar by mechanic Chang Jou'.

By the second century BC there was an imperial ban on the exportation of crossbows out of China, and in 125 AD barriers were set up at the frontiers to ensure that this could not happen. But these measures were too late, for crossbows had already been taken out of China. In the first century BC we know that they were to be found in Korea and as far west as Sogdiana in Central Asia. Within China, crossbow manufacture was a state monopoly and it was carried out with all the security precautions familiar to us with modern weapons manufacture today. Cand dates for the civil service, in about the year 1030, had to answer a question in their examination: 'What would you do to detect and punish people who kept privately armour and crossbows in their homes?' Presumably only those who gave sufficiently harsh replies were allowed to join the imperial civil service.

Although crossbows came in all sizes, from pistol ones to huge artillery pieces, the problem was always one of aiming them. It took a great deal of strength, so that the earlier crossbowmen had to be very strong in order to arm the weapons by brute strength alone, which involved standing on the bows and pulling the strings back with mighty heaves and grunts. Better

aiming techniques were developed as time went on. Since China was the land where the stirrup was invented (see page 101), it is not so surprising that crossbows were eventually produced with stirrups attached to them, so that one could put one's foot in a stirrup to hold the bow down when rearming. (Standing on a bow was not possible in marshy ground for instance.) Crossbow stirrups were standard issue to troops by at least the eleventh century. A later improvement was a double-pronged claw for the crossbowman's belt so that he could stand and draw the string of his weapon by the muscular power of leg and back alone, leaving his hands free to hold it, and manipulate the trigger-catch. This was called 'waist-arming'. This technique was thought to have been used in the third century and then lost for several centuries until revived in the Middle Ages. Rotary aiming methods were also used. All of the great crossbow-cannons were armed by winches which pulled back the strings, since no human being alone could possibly have done it. These seem to have been used as early as the eighth century, though relatively rarely, and in connection with sieges. (Regarding winches, it is worth remembering that it was the Chinese who invented the crank handle, see page 49.)

Grid-sights for aiming crossbows were invented in China by the first century AD. These grid-sights were the first in the world, and were similar to the ones used on modern photographic cameras and anti-aircraft guns. Mounted on both rear and forward ends of the stocks, the sights consisted of vertical and horizontal fine wires crossing each other in grids. A third-century text speaks of the forester, with his finger on the trigger, and his bow drawn [who] aims at the target embraced in the graduations of his sights and lets fly. An even earlier ranging device on the crossbow was a series of graduated notches on the lug of the trigger-mechanism, which goes back to at least the third century BC.

How powerful actually were these Chinese crossbows? A version developed by Li Ting in the eleventh century was made of mulberry wood with the body of brass and the string of hemp. It was presented to the emperor in the year 1068. This remarkable weapon 'could pierce a large elm from a distance of 140 paces. This was very quickly made standard issue. A crossbow catapult, which took several persons to draw its string and consisted of two bows tied together, could shoot several arrows simultaneously, killing ten persons at a time. The extreme range of a large winch-armed Chinese crossbow was according to





filled. But since a properly aimed crossbow bolt could pierce through two sets of metal armour with ease, the device was safe.

The Greeks discovered the use-power of the crossbow led to the invention of machine-gun. Crossbows in about the eleventh or twelfth century. This development overcame the difficulty of aiming the crossbow, which proceeded too slowly for rapid shooting. A magazine of bolts was fitted above the arrow-groove in the stock of the crossbow and as each bolt was fired, another would drop into its place. The mechanism for firing a repeating crossbow was different from usual. The trigger was shown, and a lever was fixed permanently to the stock between the trigger and the farther rear position reached by the trigger when drawn. Pivoted to this lever was the magazine, which usually contained ten or twelve arrows. The lever was raised upon the arrow in the groove and against the string. There was a short barrel in the front. Upon pushing the lever forward to fire, if possible, the string fell away from the rear end of the longitudinal slit along the base of the magazine, permitting enough air to while the lever was drawn backwards to its fullest extent, thus arming the weapon. At this stage the arrow would have dropped fully into the arrow-groove for firing. An 'automatic trigger' in the form of a short, oval hardwood pin moving up and down in the base of the magazine below the firing slot would be forced upwards by contact with the stock, and would release the string and launch the arrow.

This could be repeated so quickly that a dozen arrows could be fired within moments. Replicas have been constructed and tested, and it has been found that firing these repeating crossbows, the Chinese could have one individual man discharge 2000 arrows in 10 seconds. The ranges of repeating crossbows were limited, however, being 200 yards, but with an effective range of 60 yards. Although the power of the weapon was diluted, such vast rapid and continuous showers of bolts raining down on an enemy were said to be extremely demoralizing, especially when one considered that the bolts were usually poison-tipped. Machine-gun crossbows were widespread in China by the year 1400 and many examples survive in museums. One may be seen in Plate 165 (page 245).

In Europe, crossbow-type artillery pieces were known to the ancient Greeks, who used them as fixed bolts in sieges, and they were used in 397 BC at Syracuse. A Pythagorean named Zopyrus of Thebes,

the highly developed leader of these devices, lived approximately that time, two years after the death of Socrates. It is difficult to know what to conclude about these early crossbow devices in Europe, but Newham believes they were introduced from China. Sicily, which was within easy sailing distance of Carthage, had Carthaginian colonies, and there were at least four specimens. Pythagoreans from Carthage who were presumably known to Zopyrus had since the Carthaginians traded continually with the region of what is today Syria and Lebanon, there was certainly a route for transmission. Syria was known to the Chinese as 'Ta Ch'in', and trade existed between the two lands. Perhaps a Chinese crossbow mechanism was smuggled out of China and sold at a high price as a high technology secret weapon. Or perhaps just a description of one was passed along the trade routes and copied by the Greeks (what is called 'imitation-diffusion'). Or the Greeks may even have made the invention entirely independently drawing inspiration as the Chinese had, from the simple bow-imp.

Plutarch of Alexandria has left a elaborate description of the crossbow artillery piece, though only the Germans have translated this fascinating work entitled *Belopoiika*. Two ancient authors who wrote about these devices were Biton and E Vegetius Renatus (fourth century AD). But with the decline of Rome as a power, the crossbow principle fell into disuse and seems to have been more or less forgotten. The Romans had certainly used hand-held crossbows for hunting, but in the eleventh century the Byzantines were horrified to encounter their first crossbow in the hands of their first Crusaders. The Byzantine historian, the prince, Anna Comnena, wrote of this new weapon, calling it the *trigona*.

The *trigona* is a barbarian bow hitherto quite unknown to the Greeks. [Description omitted.] They will pierce the stoutest metal armour, and sometimes wholly imbed themselves in a stone wall or other such obstacle when they strike it. In short, the *trigona* is a diabolical and murderous instrument, which falls men to the ground with such a shock that they do not even know what hit them.

The crossbow had made its appearance again in Western Europe in the ninth century after a gap of 500 years, and it is believed to have been used at the Battle of Hastings. It shocked some who also lived in the

Mediterranean region, that the Second Lateran Council of 1139 condemned crossbows under anathema of the Church, except for use against infidels. But 50 years later, Richard I (Lion Heart) took many of them on his Third Crusade. In 1521, Cortes used crossbows as one of his main weapons in subjugating what is now Mexico.

It is curious that the crossbow should have been used, though rarely, at an early period in Europe, and then have disappeared. This perhaps demonstrates something about the disruptions and lack of continuity of the European Dark Ages. The device may have survived as a hunting weapon for five centuries in the far west of Europe, to re-emerge in the tenth century as a weapon of war. Or it may, as Needham suspects, have been reintroduced a second time from China, perhaps through the Central Asian people known as the Khazars.

## GUNPOWDER

NEEDHAM, 1954, 1956, 1957

Gunpowder first came to the attention of the West in the late twelfth century. By that time, the Chinese had carried its development through many stages and even perfected the barrel gun and the cannon. The evolution of gunpowder and its uses was therefore essentially complete before Europe had even heard of it.

Gunpowder was invented in China not by people seeking better weapons or even explosives, but by alchemists seeking the elixir of immortality. What greater irony could there be than that men wishing to find a drug to enable them to live for ever should instead find a simple substance destined to kill millions of people?

Before gunpowder could be developed, first it was necessary to recognize and obtain the most important of its three ingredients. This is saltpetre, the chemical name for which is potassium nitrate. It was completely unknown in the West until the Middle Ages, and because it generally forms natural deposits only in hot climates there is a considerable shortage of it in Europe, while China always had abundant local supplies of it. But it is not something which is just sitting there waiting to be used: it has to be recognized for what it is, differentiated from all other similar-looking chemical salts and purified.

How is it possible to know when one has real

saltpetre, which looks more or less like any number of other chemicals? The potassium flame test is crucial for detecting saltpetre, because it burns with a violet or purple flame. This was being used to test for true saltpetre in China by at least the third century AD (2000 years before the West), the test being performed by putting a sample of the saltpetre on a piece of charcoal and watching it burn. Later an even more important test was developed, which is described by Sheng Hsuan Tzu in his book of 150, *Illustrated Manual on the Subduing of Mercury* (as quoted by the later scientist Li Shih-chen of the Ming Dynasty in the chapter on minerals in his famous 52 volume work *Compendium of Materia Medica*).

If you heat a piece of white quartz and then put a drop of the saltpetre on it, it will sink in. The Taoist books say that saltpetre from Wu-Ch'ang (Udyana) can liquefy or dissolve all metals and minerals. If consumed it can prolong life. The places where it is produced have an extremely loathsome smell, so that birds cannot fly over them. Pieces shaped like little goose quills are the best kind. Some of the saltpetre used nowadays is not natural saltpetre. At Shang-ch'en and at Hwai Chou and Wei Chou, all in Hopci Province [but nowadays in modern Henan Province], as Tsui Fang records in his book *Hui Tan Pen Tsao*, people scrape it up from the salty soil and make it from the filtered drippings: it is named 'solve-stone' because it can dissolve and transform all kinds of ores and minerals.

Here we see its initial attraction to the Chinese. Long before anyone had any idea that saltpetre could be used as an ingredient of the then still unknown gunpowder mixture, it was prized for its ability to liquefy ores and to dissolve otherwise indissoluble minerals, such as cinnabar, into watery solutions. Saltpetre was used for this purpose at least by the second century BC, as well as acting as a flux to promote metallurgical processes. Since the name 'solve-stone' goes back to the fourth century BC, it is likely that saltpetre's uses were appreciated then, though they were not specified in surviving texts until the second century BC.

When saltpetre finally came to the knowledge of the West the Arabs (who were the first to learn of it) called it 'Chinese snow'. The oldest surviving mention



sulphur and carbonaceous material were a combined, getting very close to proto-gunpowder. The saltpetre oxidized the realgar (arsenic disulphide), into arsenious oxide, and the carbonaceous material then reduced this to volatile elementary arsenic vapours which, Ko Hung said, will arise like wisps of cloth and arsenic sublimes as white as ice! Needham believes that these early associations with arsenic may have been responsible for setting a pattern, whereby arsenic was routinely incorporated into Chinese gunpowder in later centuries where its presence in bombs acted as a poison adding to the destructive effect of the explosions.

No textual evidence survives of any approximation to gunpowder mixtures for another 350 years. A book called *Methods of the Various Schools of Magical Elixir Preparations* records that around 650 the alchemist Sun Ssu-Mo made some preparations which included sulphur and saltpetre, and which were inflammable. But another 150 years were to pass before more such mixtures appeared. Chao Nai An compiled a book about the year 808 entitled *Complete Compendium on the Perfect Treasure of Lead, Mercury, Wood and Metal* which mentioned a 'Method of subduing aium by fire'

involving the mixing together of two ounces each of sulphur and saltpetre with a third of an ounce of dried birthwort herb (*Aristolochia*). The dried herb would have contained sufficient carbon to make this mixture liable to ignite suddenly and burst into flames, though it would not actually have exploded. This has been confirmed by a modern experiment where the mixture was prepared. It may be that over the centuries since 300 AD, such inflammable mixtures were continually found and just as continually avoided as being too dangerous, and hence did not enter into the texts, which were concerned with useful (or ostensibly useful) recipes. But this is speculation. The fact is that five-and-a-half centuries passed after Ko Hung before Chinese alchemists recorded a formula which can be genuinely described as a gunpowder mixture. And so it is that we set 850 AD as the approximate date for the invention of gunpowder.

The first textual recording of a proto-gunpowder formula is found in a book entitled *Classified Essentials of the Mysterious Tao of the True Origin of Things*, preserved in the great collection of Taoist classics. It was attributed to Cheng-Yin the teacher of Ko Hung, but this is believed to be a fictional authorship, and the book is dated to about 850. The book contains thirty-five elixir formulae which are to be avoided as wrong or dangerous, three of these involving saltpetre. But the crucial passage reads:

Some have heated together sulphur, realgar (arsenic disulphide), and saltpetre with honey, smoke and flames result, so that their hands and faces have been burnt, and even the whole house where they were working burned down. Evidently this only brings Taoism into discredit, and Taoist alchemists are thus warned clearly not to do it.

It should be noted that the honey would have contained carbon, and the drier the honey the more the carbon. We do not know how long this sort of thing had been going on, but Needham takes the date



LEFT (1647) A woodcut published in the 1647 edition of the popular novel *Chu Ping Ai* (named after its three main female characters) showing a public fireworks display. To the left of the pole, near the bottom, is a spinning Catherine wheel. Fireworks were the first form of Chinese gunpowder to reach the West in the late twelfth century. The Chinese knew how to make them in a wide variety of different colours.





A very good book  
 on the history of  
 gunpowder  
 by  
 Kenneth  
 ...

of this book, 850 AD, as the date of the first true  
 appearance of what the Chinese called the 'fi-  
 h-mei' that is, gunpowder.

It was around the year 1040 that T'ien Kung  
 Liang published a true gunpowder formula for the  
 first time in his story. Certainly true gunpowder and its  
 uses had been known by this time for at least a

century. Tseng gives three gunpowder formulas for  
 three different weapons. A 'quasi' explosive had to be  
 ignited by a kind of 'spark' during a battle with  
 hooks which could set iron yondan (iron rods) and  
 set them on fire and a 'quasi' rocket could be set  
 on fire. The gunpowder in the 'quasi' was not explosive  
 but rather what is called 'deflagrative' that is it  
 burned 'with a sudden and sparkling combustion  
 and a great whoosh like a rocket. The bombs did

not contain enough saltpetre to explode. This  
 would come later.

The first use of gunpowder in war was not  
 however anything so dramatic as an incendiary  
 bomb. Around 1000 we find it used in the form of  
 gunpowder-impregnated slow match for the  
 ignition of the flame-thrower. The Chinese  
 (see page 254) sprayed enemies with burning  
 gasoline. As it passed from the pump it was ignited by  
 the gunpowder-impregnated fuse, so that showers of  
 flame descended upon them.

When explosive gunpowder did not  
 improve him, rather than merely incendiary  
 bombs were produced in large quantities. As the  
 proportion of saltpetre in the mixture increased a  
 point was reached where the proportion of  
 saltpetre was too low to be effective. Around  
 1600 gunpowder became a new pasteurized  
 explosion mixture. When the proportion of  
 saltpetre was too low to be effective, the

possible (see page 266). Upon ignition, gunpowder of this type suddenly produces 3000 times its bulk in gas, reaching temperatures of the order of 3880°C. The rapidity of the phenomenon is made possible by the fact that the oxygen is in the saltpetre within the mixture, so that no oxygen needs to be sucked in from the surrounding air.

All these stages, from accidental accidents and singed Throat beards through to the true barrel gun and cannon, had been reached by the Chinese before anyone in the West had ever even heard of gunpowder, let alone seen it in use. But what Westerners lacked in initial knowledge, they made up for in later enthusiasm.

## THE FLAME THROWER

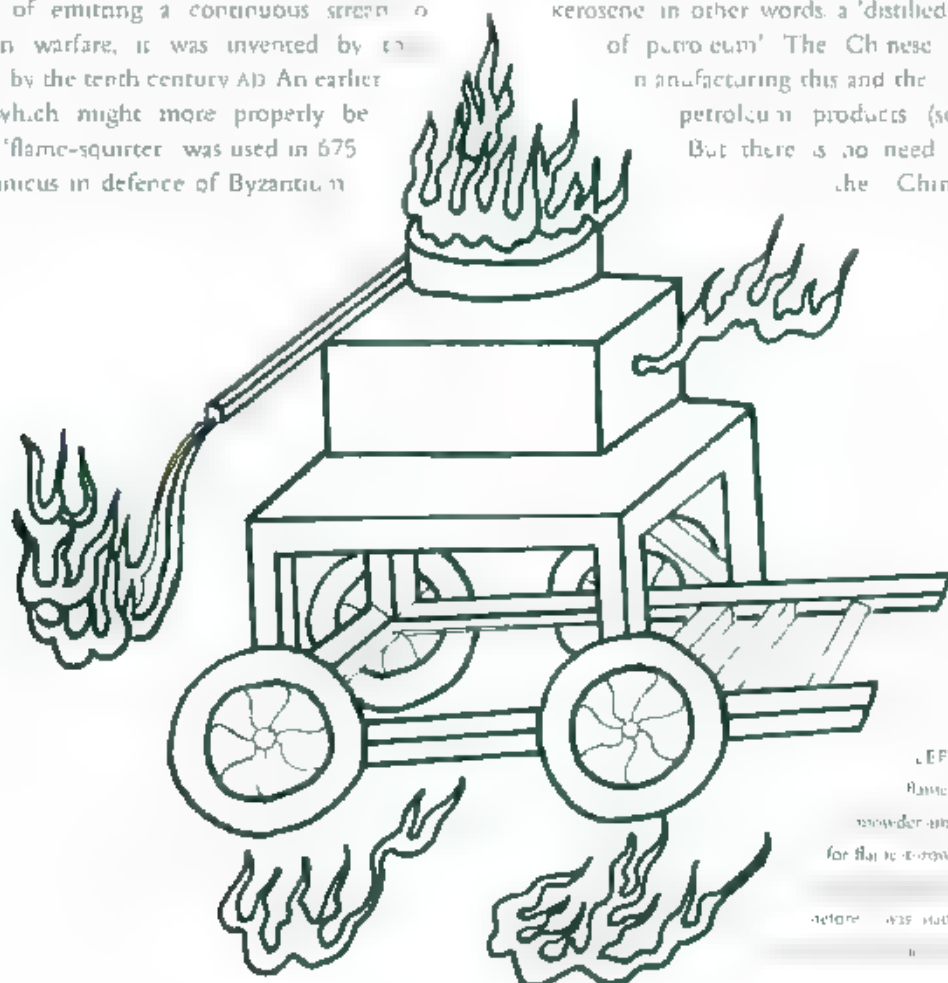
The flame-thrower was not invented in the twentieth century, as most people would naturally assume. If one considers a flame-thrower to be a device capable of emitting a continuous stream of flame in warfare, it was invented by the Chinese by the tenth century AD. An earlier form, which might more properly be called a 'flame-squirter', was used in 675 by Callinicus in defence of Byzantium.

It had a 'siphon' which apparently pumped flame by means of a single-acting force-pump which was rather like a large syringe (invented in the West by Ctesibius in the third century BC). The proto-flame-thrower of the Byzantines was apparently incapable of ejecting a continuous stream of flame: it sent out a burst of flame, was repumped, and then gave another burst.

The reason for the superiority of the Chinese device, and the reason we consider it to be the first genuine flame-thrower was the continuous stream of flame made possible by the Chinese invention of the double-acting piston bellows (see page 46), which was also used in chemical warfare by the early fourth century BC for spraying soldiers with clouds of poison (see page 240). The superiority of Chinese metallurgy is also apparent here: as the flame-thrower was made of the very best cartridge-quality brass, containing 70 per cent copper.

What was it that the flame-thrower actually threw? What was burnt to make this stream of fire? According to Needham, it was either gasoline or kerosene in other words a 'distilled light fraction of petroleum'. The Chinese had stills for manufacturing this and they certainly used petroleum products (see page 89).

But there is no need to think that the Chinese actually



LEFT 17 A Chinese flame-thrower as a powder-impregnated tow for flame-throwers were the first before was made with sulfur. It

invented this, for J.R. Partington in his *History of Greek Fire and Gunpowder* (1960) concluded that the Greek Fire used by the Byzantines in their flame-thrower was the same substance. And Needham points out that 'Greek Fire came into China by about 900 AD.

The first use of 'Greek Fire' in a flame-thrower in China appears to be in the year 1064. Lu Chen, in his *Historical Memoirs of the Nine States*, recounts an engagement of that date and says 'Cheng Fan's men let off flying fire machines, which burnt the Lung-sha Gate.' We have a far clearer account of flame-throwers in a description of the naval battle on the Yangtze River in 975, preserved by Shih Hsu-Pai in his book *Tales of a Chineseman's Recollections*.

Chu Ling-Pin as Admiral was attacked by the Sung emperor's forces in strength. Chu was in command of a large warship more than ten decks high, with flags flying and drums beating. The imperial ships were smaller but they came down the river attacking fiercely, and the arrows flew so fast that the ships under Admiral Chu were like porcupines. Chu hardly knew what to do. So he quickly projected petrol from flame-throwers to destroy the enemy. The Sung forces could not have withstood this, but all of a sudden a north wind sprang up and swept the smoke and flames over the sky towards his own ships and men. As many as 150,000 soldiers and sailors were caught in this and overwhelmed, whereupon Chu, being overcome with grief, flung himself into the flames and died.

There is another mention of flame-throwers in the same year, in the *History of the Southern Sung Dynasty*, where we are told that a commander named Ts'ao Pin came down upon Ch'angling. He had large ships furnished with bundles of reeds saturated with thick oil with the intention of taking advantage of the wind to start conflagrations. But in urgent situations, then they used the machines to shoot the fire-forwards to resist the enemy.

In a book of 1137 by Kang Yu-Chih entitled *Dreaming of the Good Old Days*, we find a description of the storage and use of gasoline for flame-throwers. He speaks of a large reservoir more than 10 feet square in order to store 'fierce fire oil', which he says should only be stored in real glass vessels. He recalls

I myself still remember the district commanders coming to it to study and practise water-combat with their troops, and to test the fierce fire oil. The opposite bank of the lake represented the fortified camp of the enemy. Those who were in charge of the oil sprayed it about, and as it was ignited it broke into a sheet of flame, so that the [fictitious] fortifications of the enemy were all in a short time completely destroyed. What is more, the oil had a secondary effect on the water, for all the water-plants were killed, and the fishes and turtles died.

The mention of ignition in the passage above brings us to the question: how was the ejected gasoline ignited as it left the flame-thrower? Obviously it could not be burning before it left, for then the man holding the machine would be destroyed by flames himself. The answer is that a lighted fuse was held in front of the nozzle, so that when the gasoline was squirted out it was ignited after it was already on its way through the air. The fuse was impregnated with gunpowder, as mentioned in the account of gunpowder (page 250); this was the first military use of the substance. This gunpowder was so low in saltpetre content that it could not explode, but only sparked and burnt slowly in the fuse.

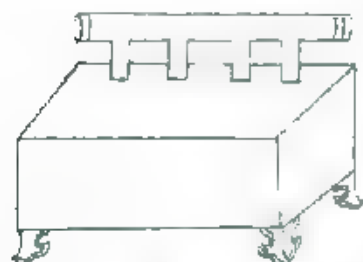
By 1044 the flame-thrower was standard issue to Chinese armies. A military encyclopedia of that date, *Collection of the Most Important Military Techniques*, gives drawings of a flame-thrower with design details (see Plate 172 (page 256)). The text says: 'If the enemy comes to attack a city, these weapons are placed on the great ramparts, or else in outworks, so that large numbers of assailants cannot get through.' There is a lengthy description of the device, which commences

On the right is the gasoline flamethrower. The tank is made of brass, and supported on four legs. From its upper surface arise four [vertical] tubes attached to a horizontal cylinder above; they are all connected with the tank. The head and tail of the cylinder are large, the middle is of narrow diameter. In the tail end there is a small opening as big as a millet-grain. The head end has two round openings 1½ inches in diameter. At the side of the tank there is a hole with a little tube which is used for filling, and this is fitted with a cover.

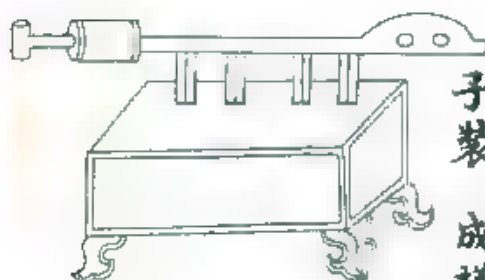
# 樓火



## 筒橫



## 杖絲撈



猛火油櫃筒橫  
子裝成樣

The description continues in meticulous detail, observing that with the action of the piston, 'the oil comes out through the ignition-chamber and is shot forth as blazing flame.' Needham has reconstructed the details of the mechanical operation of the flame-thrower and concluded that it had 'two of the tubes secretly connected within the tank. Such a design is very compatible with the directions in the text that the machine was to be started with the piston-rod pushed fully forward, and it also agrees with the statement that the "two" communicating feed tubes are alternately occluded.' The flame-thrower gave a continuous jet of flame 'just as the double-acting piston bellows gave a continuous blast of air, and the most obvious way of effecting this was to have a pair of internal nozzles one of which was fed from the rear compartment on the backstroke.'

LEFT (177) An illustration of a Chinese flame-thrower, published in 1611, redrawn from an encyclopedia of 1744. The Chinese invented the continuous flame-thrower in the tenth century, having known of the seventh-century spurting flame-thrower of the Byzantines via Central Asia. Here we see the tank standing on four feet with the pump and ejector above it. Because the Chinese invention of a double-acting piston bellows was used with this device, a continuous stream of flame could be emitted. The metal used was cartridge-quality brass.

## FLARES, FIREWORKS, BOMBS, GRENADES, LAND MINES AND SEA MINES

Fireworks existed in China before gunpowder was invented. Pieces of bamboo were thrown into fires and exploded as fireworks from at least 200 BC. Even after gunpowder fireworks were invented, the exploding bamboo was retained until modern times. Because a fireworks tradition already existed in China, the advent of gunpowder was seen as a natural progression.

The Chinese love to accompany celebrations with explosions. Here is a description of early fireworks from a book entitled *Dreaming of the Capital while the Rice is Cooking*, published in 1275 by Wu Tzu-Mu.

Inside the palace the fire-crackers made a glorious noise, which could be heard in the streets outside. All the boats on the lake were setting off fireworks and fire-crackers, the rumbling and banging of which was really like thunder.

The Chinese rapidly developed every conceivable type of fireworks, including spinning catherine wheels and rockets (for the invention of the rocket see page 262). They also had coloured explosions, using a wide variety of special materials. They could obtain brilliant sparkling effects by combining steel dust or tiny shavings of cast iron, reduced to a powder, with the gunpowder. They used these effects in their Roman candles, which also preceded any made in the West. Blue-green flashes could be obtained by using indigo, white by using white lead carbonate, red by using red lead tetroxide, purple by using cinnabar, black by using lignite and soap-beans, yellow by using arsenical sulphides, and violet by using a lot of things - cotton



fibres. No festivity in China ever lacked colour after the invention of gunpowder.

It has already been mentioned (page 251) that the first bombs were incendiary ones using a gunpowder with insufficient saltpetre to cause a proper explosion. There was a long history of incendiary weapons of all kinds throughout the world, but when gunpowder became available in China it was incorporated into incendiary weapons to deadly effect. No longer were such things as pitch and flammable resins and oils the main substance of incendiary arrows and bombs. In the tenth century, a whole new wave of incendiaries appeared, using gunpowder. Fire arrows were now tipped with little gunpowder bundles wrapped in paper and sealed with wax and had gunpowder-impregnated fuses. We have seen how in 919 the flame-thrower used such fuses (page 255).

In 994 a gigantic force of 100,000 besiegers was driven away from the city of Tzu-tung using these gunpowder fire arrows. These gunpowder projectiles would set fire to anything inflammable, whether tents, clothing, besieging engines, trench walls made of wood, stores of hay or food wagons. The commander Chao Hs-eh is reported to have had a supply of 250,000 gunpowder-armed arrows in the year 1083; mass production of these weapons was evidently in full swing.

By the first half of the eleventh century, a new kind of gunpowder bomb came onto the scene. Called a 'thunderclap bomb' this was truly explosive, and had a high percentage of saltpetre. It was enclosed in a weak casing of bamboo or paper and hurled from trebuchets, which had previously been used to hurl great stones at enemy fortifications with slings and then incendiary bombs. Thunderclap bombs were far more effective in starting fires; they also terrified the enemy's horses with explosive sounds and many barbarian tribes were seriously demoralized by the noise alone, at first. These bombs either had fuses or were ignited by a red-hot poker just before being hurled.

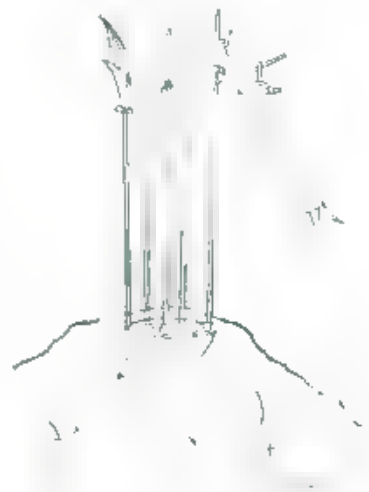
Here is the eleventh-century description of how to make an explosive bomb:

The thunderclap bomb contains a length of two or three internodes of dry bamboo with a diameter of 1.5 inches. There must be no cracks, and the septa are to be retained to avoid any leakage. Thirty pieces of thin broken porcelain the size of iron coins are mixed with 3 or 4 lb of gunpowder, and packed around the bamboo tube. The tube is wrapped within the ball, but with about an inch or so protruding at each end. A gunpowder mixture is then applied all over the outer surface of the ball. A long red-hot iron brand is used to set off the thunderclap bomb, which produces a noise indeed like thunder.

This extract is from the *Collection of the Most Important Military Techniques*, published in 1044. There is an eyewitness account of the use of thunderclap bombs in fighting off a siege in the late eleventh century, written by the commander Li Kang. 'At night the thunderclap bombs were used in hitting the enemy well, and throwing them into great confusion. Many fled, howling with fright.'

Thunderclap bombs also came in the form of grenades which could be hurled by hand. A scholar, Yuan Hao-Wen, recorded an extraordinary story in a book published in 1187, describing the use of thunderclap grenades by a hunter.

Towards the end of the Ta-T'ing reign-period there lived north of T'ai-yuan a certain hunter named T'ieh Li. One evening he found a great number of foxes in a certain place. So knowing the path that they followed, he set a trap, and at the second watch of the night he climbed up into a tree carrying at his waist a vessel of gunpowder. The coven of foxes duly came



LEFT 77, A fourteenth-century land mine booby-trap called the underground sky-soaring thunder.

A group of halberd pikes and banners is stuck into the ground as a tempting trophy. When the enemy approaches to seize them, he steps on a mechanism which lights a fuse and he is blown up by the land mines buried underground.



As a result, the Chinese were able to develop a new type of bomb, the thundercrash bomb, which was a great improvement on the earlier types. The Chinese also invented flares, which they called 'light bombs' (see page 11). The Chinese also invented the 'thundercrash bomb' (see page 11). The Chinese also invented the 'thundercrash bomb' (see page 11).

under the tree, whereupon he lit the fuse and threw the vessel down, it burst with a great report, and scared all the foxes. They were so confused that with one accord they rushed into the net which he had prepared for them. Then he climbed down the tree and killed them all for their fur.

The 'thundercrash bomb' was probably developed in the 13th century, and the Chinese also invented flares, which they called 'light bombs' (see page 11).

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By the 14th century, the Chinese had developed a new type of bomb, the 'thundercrash bomb' (see page 11). The Chinese also invented the 'thundercrash bomb' (see page 11).

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The thundercrash bombs appear first in the 13th century, and the Chinese also invented flares, which they called 'light bombs' (see page 11). The Chinese also invented the 'thundercrash bomb' (see page 11). The Chinese also invented the 'thundercrash bomb' (see page 11).

with a small opening and they were made from cast iron about 2 inches thick. It is thought that the same bombs were in the hands of the defenders but because they lost the siege there is less information about them. These thundercrash bombs were said to make a noise like thunder, shaking the walls of houses and killing and wounding countless people. They are not called thundercrash bombs in this account. The first use of that term occurs ten years later, in 1231, when the Chin were themselves besieged by the Mongols in a city in Shansi Province. The Chin general escaped by sea down the Yellow River with three thousand of his men, pursued along the northern bank by the ferocious Mongols who kept up a steady rain of arrows upon him. The Chin dynastic history tells us:

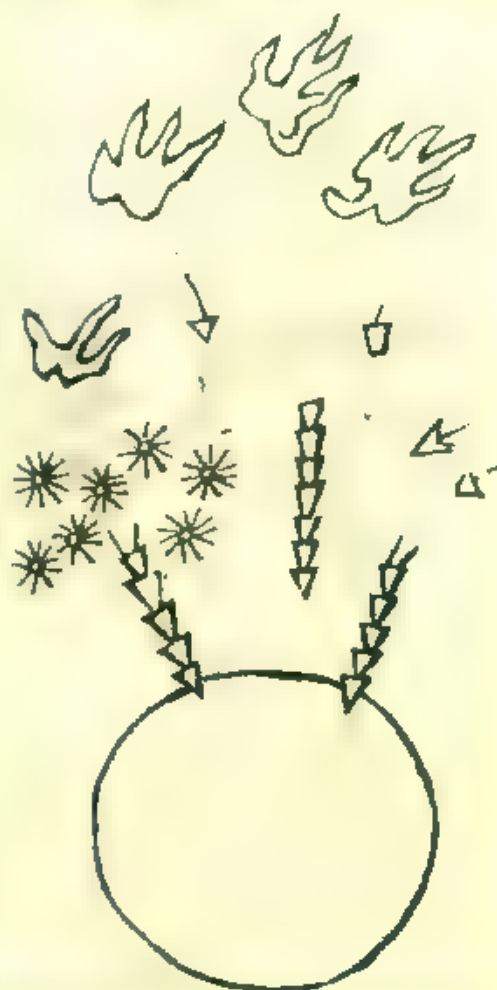
But the Chin ships had on board a supply of those bombs called 'thunder-crash' missiles and they hurled these at the enemy. Flashes and flames could distinctly be seen, eventually the Chin fleet broke through, and safely reached Tung-kuan.

In the following year, 1232, the Mongols took the capital, in the north, K'ai-feng from the Chin. In the Chin history we read of the siege:

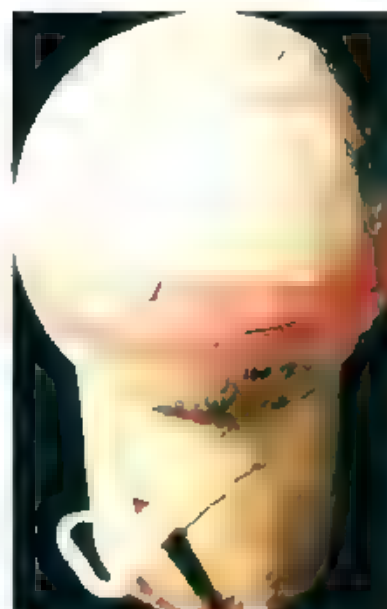
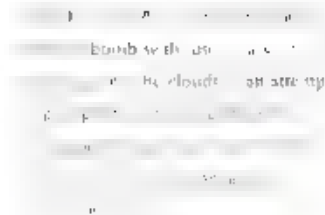
Among the weapons of the defenders there was the heaven-shaking thunder-crash bomb. It consisted of gunpowder put into an iron container, then when the fuse was lit and the projectile shot off there was a great explosion, the noise whereof was like thunder, audible for more than 100 li [tens of miles], and the vegetation was scorched and blasted by the heat over an area of more than half a mou [many acres]. When hit, even iron armour was quite pierced through. Therefore the Mongol besiegers made cowhide sheets to cover their approach trenches and men beneath the walls, and dug as it were niches each large enough to contain a man, hoping that in this way the Chin troops

above would not be able to do anything about it. But someone up there suggested the technique of lowering the thunder-crash bombs on iron chains. When these reached the trenches where the Mongols were making their dug-out, the bombs were set off, with the result that the cowhide and the attacking soldiers were all blown to bits, not even a trace being left behind. Moreover, the defenders had at their disposal flying fire-spears. These were filled with gunpowder, and when ignited, the flames shot forward for a distance of more than ten paces, so that no one durst come near. These thundercrash bombs and flying fire-spears were the only two weapons that the Mongol soldiers were really afraid of.

# 火蜂窠式



RIGHT (175): A picture of a very nasty Ming Dynasty device called a Wasps' Nest Fire Bomb. It spewed out pellets, barbs and spikes which, along with the main fire and explosives. This engraving dates from circa 1500 and was reprinted from the original block in 1883. Collection of Robert Temple.



The Mongols eventually destroyed the Chin power and moved on to attack the Sung Chinese who had long since set up a new capital in the south; this dynasty is called the Southern Sung. However, the Southern Sung were not very well prepared for the Mongol onslaught. A scholar official named Li Tseng-Po bemoaned this in 1257:

As for the weapons for attack by fire, there are or should be several hundred thousand iron bomb-shells available. When I was in Chungchow they were making one or two thousand of them a month, and they used to despatch to Hsiang-yang and Ying-chou ten or twenty thousand a time. Yet now at Chungchuang we have no more than 85 iron bomb-shells, large and small, 95 fire-arrows, and 105 fire-lances. This is not sufficient for a mere hundred men, let alone a thousand, to use against an attack by the Mongol barbarians. The government supposedly wants to make preparations for the defence of its fortified cities, and to furnish them with military supplies against the enemy, yet this is all they give us. What chilling indifference!

The only surviving contemporary picture of a bursting bombshell of the thirteenth century Japanese drawings showing a Chinese-style thundercrash bomb in a cast iron casing exploding in mid-air. The drawing was made in 1293. As for cast iron bombshells in Europe, the earliest record of their definite occurrence and use dates from 1467, exactly 246 years later than the earliest recorded use of them in China.

Over the coming years the Chinese developed a bewildering variety of different bombs with specialist

uses, some packed with what military writers today call 'ammunition material', to increase the shrapnel effect. There were also many poison bombs, gaseous bombs, and bombs filled with human excrement. Some of the best known bombs and grenades were 'the bone-burning and bruising fire-oil magic bomb', the 'magic fire meteoric bomb that goes against the wind', the 'dropping-on-the-ground bomb', the 'bee-swarm bomb', the 'magic for ten thousand enemies bomb', the 'flying-sand magic bomb releasing ten thousand fires' and the 'wind and dust bomb'.

By 1277 the Chinese had developed bombs to the point of their being used as land mines. From that year we have reports of an 'enormous bomb' being used which was more like a land mine than an actual bomb. And by the middle of the fourteenth century descriptions of how to make land mines were actually being published in books, which is a sure sign that they were no longer secret. Here is one such description:

The mine, made of cast iron, is perfectly spherical in shape. It holds one peck or five pints of black powder, depending on its size. The 'magic gunpowder', 'poison gunpowder' and 'blinding and burning gunpowder' compositions are all suitable for use in this device. Hard wood is used for making the wad, which carries three different fuses in case of defective connection, and they join at the 'touch hole'. The mines are buried in places where the enemy is expected to come. When the enemy is induced to enter the mine-field the mines are exploded at a given signal, emitting flames and fragments and a tremendous noise.

This is from *The Fire Drake Artillery Manual*, which was published in 1412 and contains some mid-fourteenth century material. Another mid-fourteenth century land mine recorded in the same book was actually a network of mines called 'the ground-thunder explosive camp', described as follows:



These mines are mostly installed at frontier gates and passes. Pieces of bamboo are sawn into sections 9 feet in length, all septa in the bamboo being removed, save only the last, and it is then bandaged round with fresh cow-hide tape. Boiling oil is next poured into the tube and left there for some time before being removed [This is thought to have been to seal the bamboo against damp from the ground as well as insect attack, to which bamboo is notoriously prone.] The fuse starts from the bottom of the tube, and black powder is compressed into it to form an explosive mine. The gunpowder fills up eight-tenths of the tube, while lead or iron pellets take up the rest of the space; then the open end is sealed with wax. A trench 5 feet in depth is dug for the mines to be concealed. The fuse is connected to a firing device which ignites them when disturbed.

The same also describes a 'self-triggered trespass mine'.

It is made of iron or rock, or even porcelain or earthenware, with a cavity inside, very like the explosive mine mentioned above. Outside, the fuse runs through a series of 'fire-ducts', which

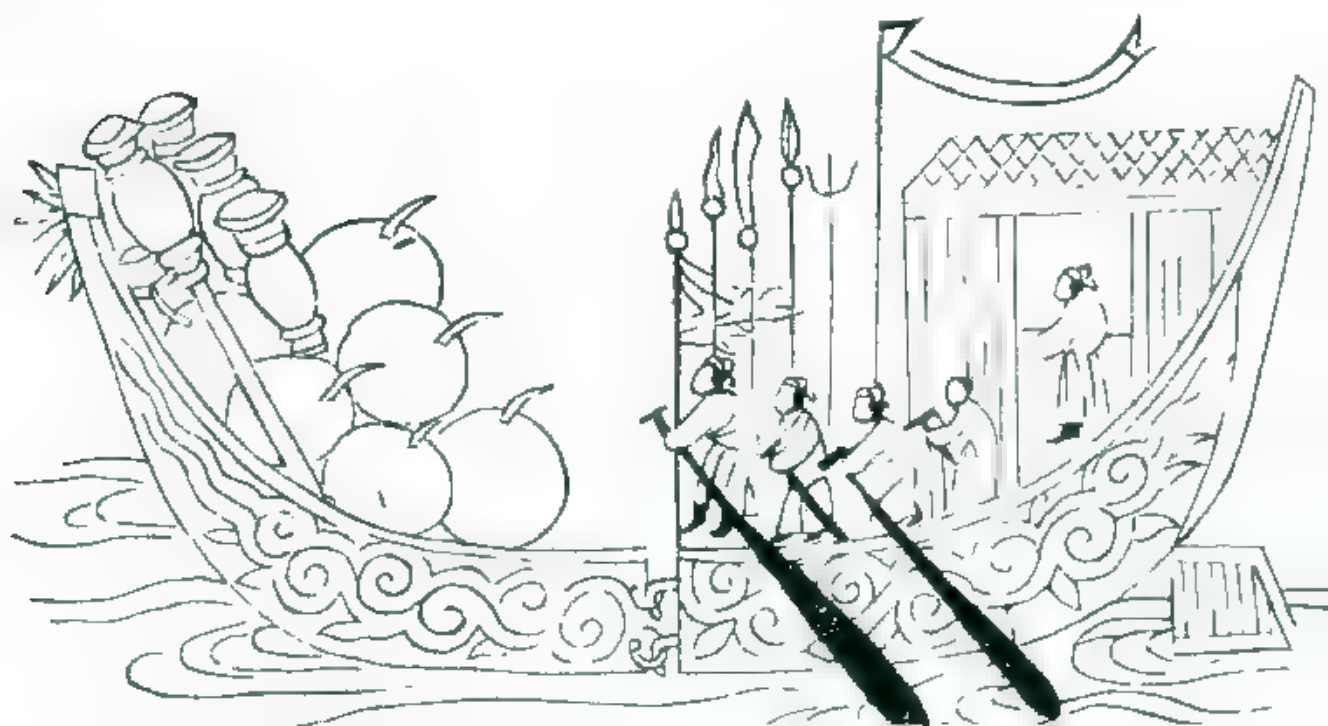
connect together several of these devices installed at strategic points. When the enemy ventures onto ground containing one of these mines, all the others are set to explode quickly one after another.

Yet another land mine described in the same book called 'the Supreme Pole combination mine' featured a battery of eight little guns pointing in different directions, all set off by an automatic trigger mechanism. It was more in the nature of a booby-trap to be laid in mountain passes, dating from the early fourteenth century.

Some of the trigger-mechanisms of Chinese land mines remained secret until the seventeenth century, when descriptions of them were finally published. Some involved arrangements of flint and steel which when automatically triggered by a cord would strike and send sparks onto tinder, which then lit gunpowder in prepacked fuses leading to the mines. There were at least two steel wheel systems. These land mine triggers would seem to be the ancestors of the flintlock rifle, going back to 1360 at least.

In Europe, the wheel-lock musket first appeared in a drawing by Leonardo da Vinci in 1500, but the

BELOW: 1717. An illustration of the last sixteenth century, used as a mine-sweeper. The front is loaded with sea mines. When the barge approaches the target the front portion is detached and left with a mine fuse burning, while the mine is the rear portion quickly row away.



first actual example to be recorded dates from 1526. And the first European flintlock did not appear until 1547. Needham believes that the flint and steel land mine triggers of China were the direct forebears of these European mechanisms, though perhaps transmitted by 'stimulus-diffusion', which is the transmission of an idea or description rather than an actual object. The first appearance of land mines in Europe is thought to have been in the war between Pisa and Florence in 1403. And the first European land mines using triggers for ignition at a distance were developed by Samuel Zimmermann of Augsburg in 1573.

The Chinese did not restrict themselves to land mines. They also invented sea mines. *The Fire-Drake Artillery Manual* gives this description:

The sea mine called the 'submarine dragon-kung' is made of wrought iron, and carried on a submerged wooden board, appropriately weighted with stones. The mine is enclosed in an ox-bladder. Its subtlety lies in the fact that a thin incense-stick is arranged to float above the mine in a container. The burning of this joss-stick determines the time at which the fuse is ignited, but without air its glowing would of course go out, so the container is connected with the mine by a long piece of goat's intestine through which passes the fuse. At the upper end the joss-stick container is kept floating by an arrangement of goose and wild-duck feathers, so that it moves up and down with the ripples of the water. On a dark night the mine is sent downstream towards the enemy's ships, and when the joss-stick has burnt down to the fuse, there is a great explosion.

This Chinese sea mine of the fourteenth century was thus two centuries earlier than the oldest known European plan for a sea mine, which was presented by Ralph Rabbards to Queen Elizabeth in 1574. The Chinese were still using sea mines in fighting against the British in 1856 on the Canton River.

The Chinese were thus not slow to exploit all the explosive potentials of gunpowder. We shall shortly see how they developed the barrel gun and the cannon, which were also implicit in the development of their fire-chemical.

## THE ROCKET, AND MULTI-STAGED ROCKETS

FOURTEENTH AND FIFTEENTH CENTURIES AD

The invention of the rocket in China seems to have been doubly inspired. On the one hand, incendiary fire-arrows gave way to the idea of an arrow-shaft which could have a rocket mounted on it, so that arrows would no longer need to be fired from bows at all. On the other hand, inspiration came from a type of firework known as the 'ground rat' or the 'earth rat' which sped along the ground spewing flames from behind. We have an amusing story of a 'ground rat' running amok in the imperial palace in the year 1264.

When the Emperor Li Tsung retired, he prepared a feast in the Ch'ing-Yen Tien Palace Hall on the 15th day of the first month of the year in honour of his mother, the Empress-Mother Kung Sheng. A display of fireworks was given in the courtyard. One of these, of the 'ground-rat' type, went straight to the steps of the throne of the Empress-Mother, and gave her quite a fright. She stood up in anger, gathered her skirts around her, and stopped the feast. Li Tsung, being very worried, arrested the officials who had been responsible for making the arrangements for the occasion, and awaited orders from the Empress-Mother. At dawn next day, he went to apologise to her, saying that the responsible officials had been careless, and took the blame upon himself. But the Empress-Mother laughed and said, 'That thing seemed to come specially to frighten me, but probably it was an unintentional mistake, and it can be forgiven.' So mother and son were reconciled and just as affectionate as before.

There were also 'water rats', fireworks of this type which were tied to floats or little skis and went skidding across lakes and ponds in firework festivals. Chou Mi in his book *Customs and Institutions of the Old Capital*, written in the middle of the thirteenth century but describing festivities of the mid-twelfth century, speaks of fireworks of those days.

Some of these were like wheels and revolving things, others like comets, and others again shooting along the surface of the water.

The latter were water rats but could not like fireworks were a type of rocket. Around 1350 it crossed someone's mind that an earth rat or 'water rat' tube attached to a feathered stick would constitute a rocket-arrow equipped to fly without being launched from a bow. We even have an early description of how

One uses a bamboo stick 4 feet 2 inches long, with an iron or steel arrow-head  $4\frac{1}{2}$  inches long smeared with poison, and some smear that on the rocket-tube too. Behind the feathering there is an iron weight four-tenths of an inch long. At the front end there is a carton tube bound onto the stick, where the 'rising gunpowder' is lit and it is oiled to prevent its getting wet. When you want to fire it off, you use a frame shaped like a dragon, or else conveniently a tube of wood or bamboo to contain it or launcher boxes of different kinds.

Another book gives further details about the crucial invention of balancing weights.

An iron weight is fixed at the rear end of the rocket-arrow, behind the feathering, of such a mass that the fulcrum of the balance is situated just four finger-breadths away from the mouth of the rocket-tube.

These counter-weights enabled the rockets to travel considerable distances by holding down their rear ends in order to avoid the rocket arrow's tipping down and hitting the ground.

The same early text adds the even more remarkable description of the need to bore a hole in the centre of the gunpowder (a dangerous business: the boring tool needed to be moistened continually with water to avoid explosion from the friction). When the gunpowder burned, there

would be equal areas of combustion surface along an internal cavity in the powder, which was a necessary requirement for an efficient rocket. The text tells us:

If the hole is straight-sided [i.e., parallel with the walls of the tube] the arrow will fly straight; if it is slanting the arrow will go off at a tangent. If the hole is too deep the rocket will lose too much flame at the rear, if it is too shallow, it will not have enough strength, so the arrow will fall to the ground too soon. If the rocket-tube is 5 inches long, the cavity must extend into it some 4 inches. The shaft has to be absolutely straight, and the rocket-tube and end-weight of the arrow must balance perfectly when suspended two inches from the neck, or throat [i.e., nozzle], of the rocket-tube, while the feathering should be almost as long as the rocket-tube itself.

There were even diagrams published showing the boring tool, and illustrating the cavity. All of these developments had taken place during the twelfth and thirteenth centuries. By 1300 at the latest, the furthest refinement of rockets had taken place whereby the orifice of the rocket-tube was constricted to increase the flow velocity of the issuing gases, giving greater power. This choke, or nozzle, thus represented the 'Venturi-tube effect' which is one of the most elementary principles of aerodynamics since it gives the explanation for the occurrence of lift in connection with airplane wings. The principle was formulated in Europe by G. B. Venturi (1746-1822). The Chinese were therefore about 500 years in advance of him in their use of the principle.



LEFT: 17th Century. The rockets are strapped to the launcher. The rockets are strapped to the launcher. The rockets are strapped to the launcher.

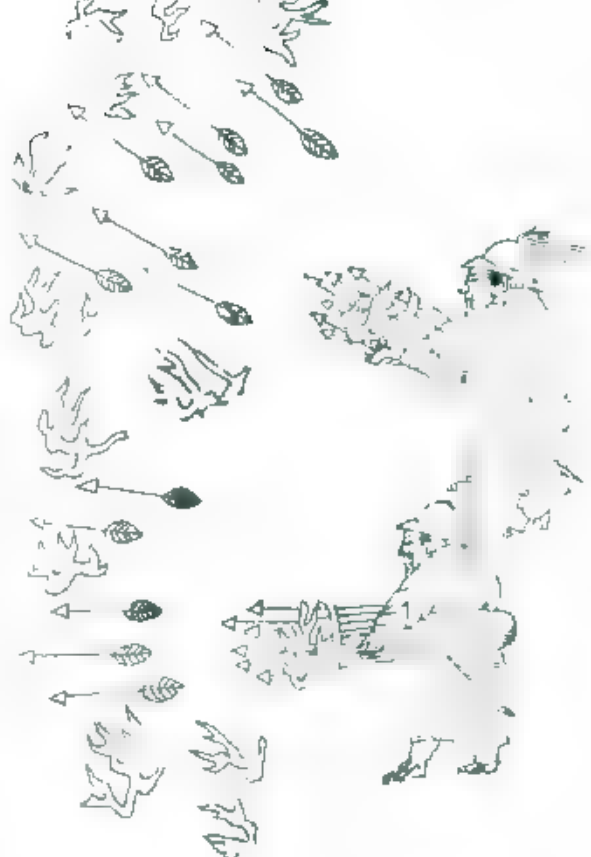
**RIGHT** 1291 Rockets were invented in China by the eleventh century and were commonly strapped to arrows with poisoned tips. Here we see portable basketwork rocket-launchers in use in the fourteenth century. These rockets had a range of 700 yards or more. The launchers and rockets were not heavy, and were frequently carried by large numbers of foot soldiers. Tens of thousands of rockets were often fired during a single battle.

The gunpowder used in these early Chinese rockets is thought to have been about 60 per cent saltpetre. There were various mixtures, of which the names but not the proportions have survived: 'wind-opposing gunpowder', 'flying-in-the-air-gunpowder', 'flying gunpowder', and so on. Needham believes that the proportions were suppressed for the sake of military secrecy.

These rockets could fly between 500 and 1150 yards though during the fourteenth or fifteenth century a device called the 'flying powder tube' was invented which is said to have flown by rocket power to the enemy, dropping an explosive charge of poison and being flown back by a second rocket lit by a fuse. This device, which in theory could be re-used indefinitely, probably hardly ever worked. It was difficult enough controlling the flight direction of rockets, without also having to rely on their correct return. But it was certainly a bold and ingenious idea.

It soon became obvious to the Chinese that setting off the occasional rocket on its own was insufficient. They needed batteries of them. By fixing them within frames of rocket-launchers, they could direct them more reliably. And by making the frames take batches of them at once, barrages of rocket fire could and did wreak great havoc in warfare. There were even hand-held portable rocket launchers woven of basketwork. These conical basket launchers would not have outlasted one mass firing, but were easily replaceable; they were really the medieval equivalent of the bazooka so widely used in the Second World War.

The wheelbarrow (invented in China see page 95) was regularly used to hold portable batteries of rocket launchers. These were called fire-frame combat-vehicles. Wonderfully evocative names were given to the different types of rocket launchers: 'Mr Facing-Both-Ways rocket-arrow firing basket', 'Five-tigers-springing-from-a-cave rocket-arrows', 'Pack of one hundred tigers running together', 'Covey of hawks catching rabbits', 'Leopard pack unexpectedly scattering'



'Bees' nest', and 'Forty-nine simultaneously fired rocket arrows'. The splayed rocket launchers had internal diaphragms with holes in them to keep the rockets apart, and the launchers widened at the top from a narrower base, to ensure a wide area of dispersion of the points of impact of the rockets. An early text gives the description of one of the smaller portable ones:

#### The small bamboo rocket-arrow tube

Each tube holds ten short rocket-arrows, only 9 inches long, and poison is applied to the head of each. The total weight of the tube and its contents does not exceed 2 pounds, and each soldier can carry four or five of them on its sling easily. The enemy would not know exactly what they were transporting. At a distance of some 170 yards away, the rocket-arrows are all fired as one. These arrows, though small, are fast, and the enemy cannot avoid them, so one soldier can do as much harm with these arrows as several dozen others using more conventional arms. These rocket quivers can be carried by the personal guards of the commander, or by the detachment



of soldiers surrounding the flag, or else by men scattered among ordinary fighting units. The rocket-arrows should be tested to ensure that they can penetrate thin wooden planks. If the bamboo tube is slightly raised at the time of firing, the arrows can reach over 340 yards. This weapon should not be overlooked just because the arrows are so small.

Descriptions of rocket-launchers in medieval Chinese books tell of batteries which could each dispatch 320 rockets at a single moment. These consisted of four 'long serpent' rocket launchers in rows on wheel barrows together with two rectangular wooden hundred tiger rocket launchers, one on either side. During the Ming Dynasty there is a battle account of a hundred of these operating together in an engagement. Such a super-battery was theoretically capable of launching 32,000 rockets at a single time, and during the course of a battle must have used up roughly a million rockets.

Stabilizing devices for rockets in flight were introduced by the Chinese not long after 1300, and are recorded in *The Fire-Drake Artillery Manual* published in 1412 but incorporating material a century older. These took the form of fins and wings so that the result looked like a bird with rockets strapped under its belly. The text says:

**The 'flying crow with magic fire' winged rocket bomb.**

The body of the bird is made of fine bamboo laths or reeds forming an elongated basketwork, in size and shape like a chicken, weighing over 1½ pounds. It has paper glued over to strengthen it, and it is filled with explosive gunpowder. All is sealed up using more paper, with head and tail fixed on before and behind, and the two wings nailed firmly on both sides, so that it looks just like a flying crow.

Under each wing there are two slanting rockets. The fourfold branching fuse, connected with the rockets and about a foot long, is put through a hole drilled on the back of the bird. When in use, this main fuse is lit first.

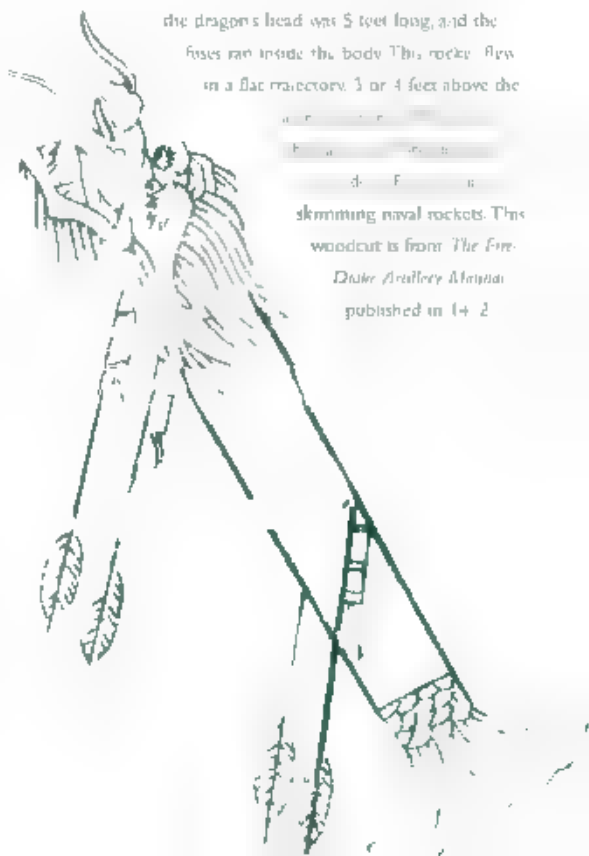
The bird flies away more than 1000 feet, and when it eventually falls to the ground, the explosive gunpowder in the cavity of the bird is automatically lit, and the flash can be seen miles away. This weapon is used against enemy

encampments to burn them, but also at sea to set ships on fire. It should never fail to bring victory.

It will immediately be obvious how strong a resemblance this weapon bears to the notorious V-1 rockets of the Second World War. As in the case of the V-1, there was little control over where the bomb might drop and explode when the rockets burned out. This is the world's oldest winged rocket. There were others, including a flying grenade called the 'free-flying enemy-pounding thundercrash bomb', which was a flying bomb in a cast iron casing which also gave off poisonous smoke and spilled out poison-tipped catwhips—sharp pointed objects on which men and horses would tread.

Multi-stage rockets in China go back to the early fourteenth century. We have already come across one which was supposed to fly over the enemy, drop an explosive charge, and fly back on a second rocket. Here is a description from *The Fire-Drake Artillery Manual* of the automatic lighting by a fuse of the

BELOW: (50) The flier of all multi-stage rockets, the fire dragon issuing from the water, of the early or mid-fourteenth century, which was used in naval engagements. When the rocket's rear the head burnt out, they lit fuses which ignited the second-stage rockets at the rear. The tube with the dragon's head was 5 feet long, and the fuses ran inside the body. This rocket flew in a flat trajectory, 3 or 4 feet above the



skimming naval rockets. This woodcut is from *The Fire-Drake Artillery Manual* published in 1412.

second stage of a rocket called the fire-dragon, rising from the water.

A tube of bamboo 5 feet long is taken, the septa removed, and the nodes scraped smooth with an iron knife. A piece of wood is carved into the shape of a dragon's head and fitted on at the front, while a wooden dragon tail is made for the rear end. The mouth must be facing upwards, and in the belly of the dragon there are several 'mysterious mechanism rocket-arrows'. At the dragon head there is an opening through which go all the fuses of the rockets inside.

Beneath the dragon-head on both sides there are two big rocket-tubes. Their fuses and orifices should face downwards and backwards, and their front ends must face upwards and forwards, and they are fixed tight to the body by bands of hempen cloth secured with skin- and fish-glue. The fuses of the rocket-arrows within the belly lead out from the head of the dragon, and they are divided into two. Oiled paper is used to make them firm, and they are so arranged as to be connected with the front ends of the outside rocket-tubes. And under the tail of the dragon on each side there are also two big rocket-tubes, fastened in the same style. The fuses of the four rockets are twisted into a single one. In a naval battle, the apparatus can fly 3 or 4 feet above the water.

Upon lighting it will fly over the water as far as 1800 yards [just over a mile]. At a distance it really looks like a flying dragon coming out of the water. When the gunpowder in the rocket-tubes is nearly all finished, that in the rocket-arrows within the belly is ignited, so that they fly forth, destroying the enemy and his ships. It can be used either on land or on sea.

This strange multi-stage rocket was a forerunner of the modern Exocet, operating in the same way by skimming the water for a long distance and hitting a ship.

Rockets thus seem to have been invented in China about 1150, and they were used in warfare by at least 206 in particular by the Sung Chinese in the defence of Hsiangyang against the Chin. As fireworks, they were in use in 1180 at Hangchow, the Southern Sung capital, as we have seen in the account by Chou

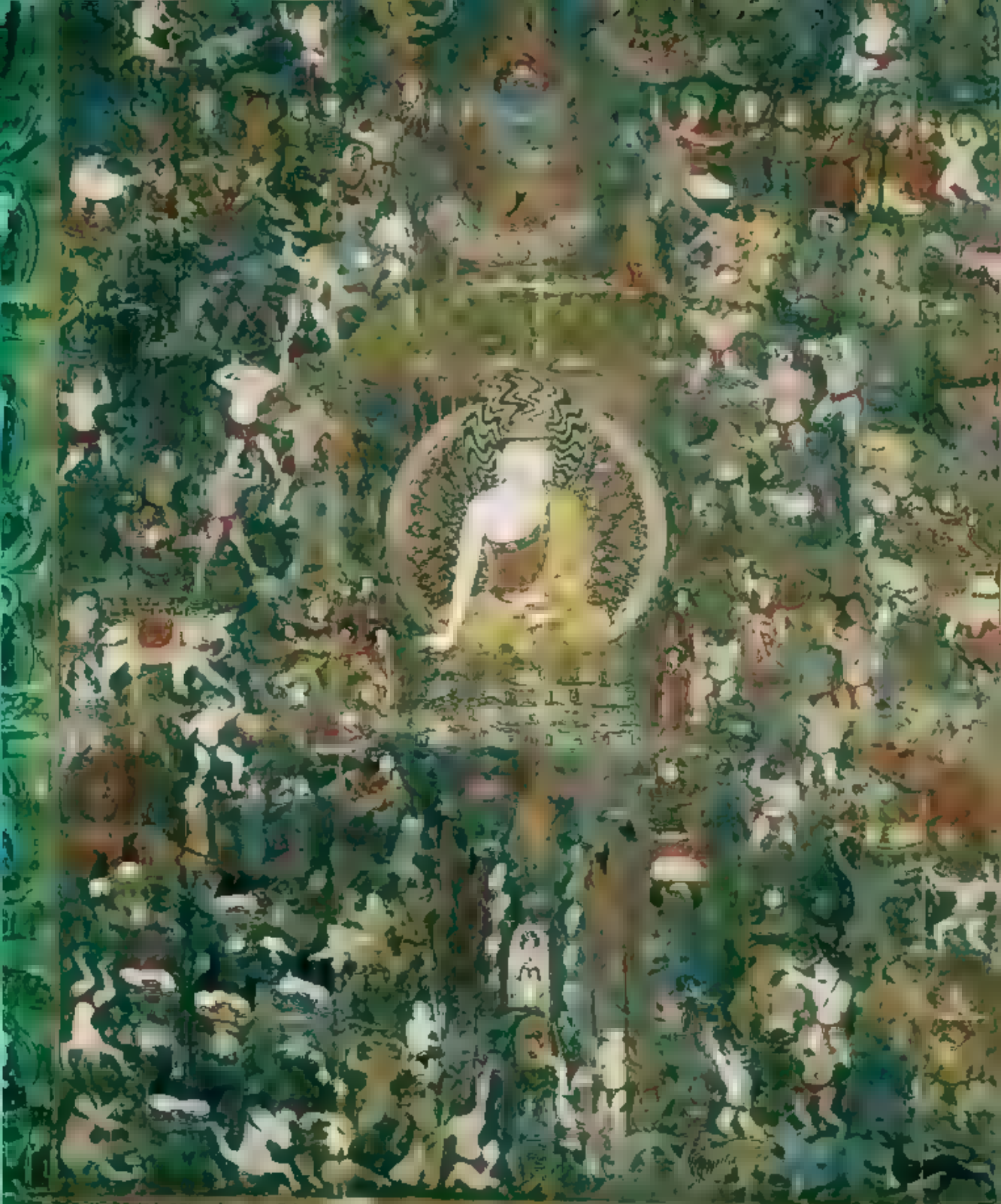
Mi. Earth rats', which were simple random ground firework-rockets, were probably the first rockets actually used in warfare at some time before the siege just mentioned. By about 1280 the Arab Hasan al-Ranirih was already describing rockets as 'Chinese arrows'.

When did rockets first appear in the West? They were first mentioned in connection with the Battle of Cingia between the Genoese and the Venetians in 1380. They must have come to Italy with Italian travellers, in the wake of Marco Polo. By 1405 Konrad Keyser in his *Beibartus* was able to write that a rocket must have a hollow space inside its charge and an arrow-shaft. The knowledge of rockets thus came to Europe much more rapidly than did most Chinese inventions. The delay was just over two centuries. But it was only in the twentieth century that liquid-fuel rockets were developed, which give the promise to mankind of colonizing outer space. The eventual use of rockets to take man to great numbers beyond his own world leads Needham to believe that the rocket was probably China's most important invention, and its greatest technological contribution to mankind.

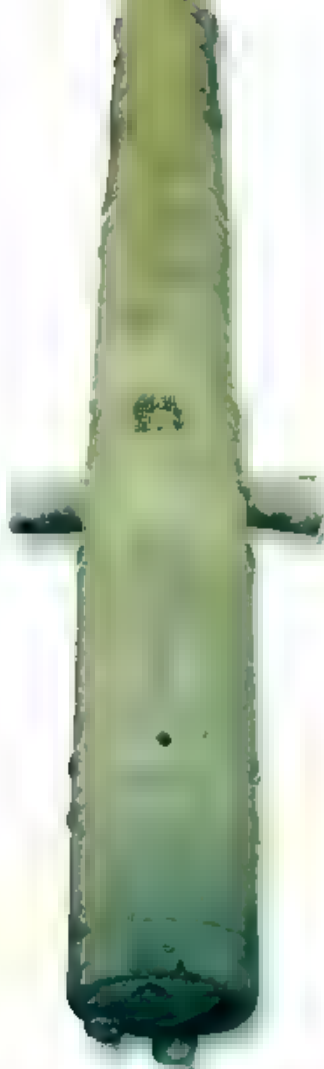
## GUNS, CANNONS, MORTARS AND REPEATING GUNS

About 905 AD the first proto-gun, called a fire lance, was invented in China. The world's oldest depiction of a 'gun' is in a detail from a silk banner painted in the middle of the tenth century (see Plate 81) (opposite). Buddha is meditating, and the demons of the evil goddess Mara the Temptress are trying to distract him. A grenade is about to be thrown at him while a demon with three snakes issuing from its head fires at him with a fire- lance. This incontrovertible physical evidence dates this invention no later than 951, much earlier than its first textual mention.

OPPOSITE 81 The world's oldest pictures of a gun and a grenade in a painted silk banner of the tenth century found at Tunhuang. The banner shows the assault on Mara, the Temptress, who is attacking the meditating Buddha. They are seeking to distract him from attainment of understanding in the magic and mechanical world of verse and to prevent his enlightenment. To the Buddha's right the demon is not, but is a proto-gun or the forerunner of a gun just below the front of a demon casting him a stone which flames have already begun to emerge. Musée Clément Paris.



RIGHT 1871 A bronze Chinese fire-lance which according to its inscription was cast during the Ming Dynasty (ended 1644). Its calibre is 9 inches, length 7 feet 4 inches. Lloyd A. Miller, Illustration Woolwich.



At first the fire-lance was essentially a Roman candle firework tied to a spear but it was more powerful than a mere firework. In fact it acted as a five-minute flame-thrower, and it could kill, blind, or maim. It was particularly useful for defending city walls against besiegers. Large numbers of fire-lances were wheeled round on trolleys of several layers, so that when the five minutes were up the defending soldier would be passed another fire-lance in order to keep up the fire. A fire-lance would also set on fire the clothes of an enemy, or his besieging engines, or his tents. Even after the invention of the true gun fire-lances remained popular and in fact were used right up to the middle of the twentieth century in China as protection against pirates who tried to board ships. In Europe, the fire-lance seems to have been used for the last time in the first siege of Bristol during the English Civil War in 1643. By the second siege, in 1645, it had been abandoned.

Fire-lances went through many improvements. Having started as lengths of bamboo tube which

simply spouted fire, they progressed to metal barrels. Many projectiles were fired from them though not true bullets, since the projectiles did not perfectly fit the bore of the barrel (which is necessary for a true gun). Any odd bits of broken pottery, stones, and iron or steel chips or balls, would be blown out of a fire-lance in a deadly swarm to spatter the unfortunate enemy. Clouds of projectiles could effectively be shot out 30 or 40 yards, and it was common practice to include poisonous chemicals in the gunpowder so that enemies were blasted with arsenic and other lethal substances. But of course, this could not be done if the wind blew in the wrong direction. Fire-lances also frequently spewed out arrows with poisoned tips.

In 1233, the Mongols were besieging the Chin who launched a daring night raid using fire-lances. We are told in the dynastic history:

On the fifth day of the fifth month they sacrificed to Heaven, secretly prepared fire-lances, and embarked 450 Chin soldiers outside the south gate, whence they sailed first east and then north. During the night they killed the enemy guards outside the dykes, and reached the Wang family temple. Kuan-Nu divided his small craft into squadrons of five, seven and ten boats, which came out from behind the defences and caught the Mongols both from front and rear, using the fire-spouting lances. The Mongols could not stand up to this and fled, losing more than 3500 men drowned. Finally their stockades were burnt, and our force returned.

The fire-lance doubled as a pike in close combat, as we learn from this account of a battle in 1276.

At daybreak Chuang Tsai, seeing that Shih Pi's troops were few, pressed an attack, but Shih Pi resisted furiously. Two Sung cavalrymen rushed at him to pierce him with fire-lances, but he so defended himself with his sabre that to left and right every man fell, and he himself personally killed more than one hundred.

Later fire-lances dropped their spear-points, especially when they had progressed to stronger and longer metal barrels. There were always many kinds to choose from, for different purposes.



An artillery piece evolved from the fire-lance, as well as a gun which fired an ill-fitting shell, and was hence not a true gun. Since there is no specific name for these projectiles, Needham has christened them 'eruptors', and erupt is what they did. Like fire-lances, they spewed forth fire and flame mixed with poisons and assorted bits and pieces. They fired arrow pellets, stones and cannon balls. Some of them even fired exploding canisters with attached fuses which blew up after landing.

Should anyone think these fire-lances and eruptors were just noisy toys unlikely to cause much damage, it pays to read these remarks from the mid-thirteenth century about a 3-foot-long fire-lance which fired arrows and was called the 'single-flight magic fire arrow':

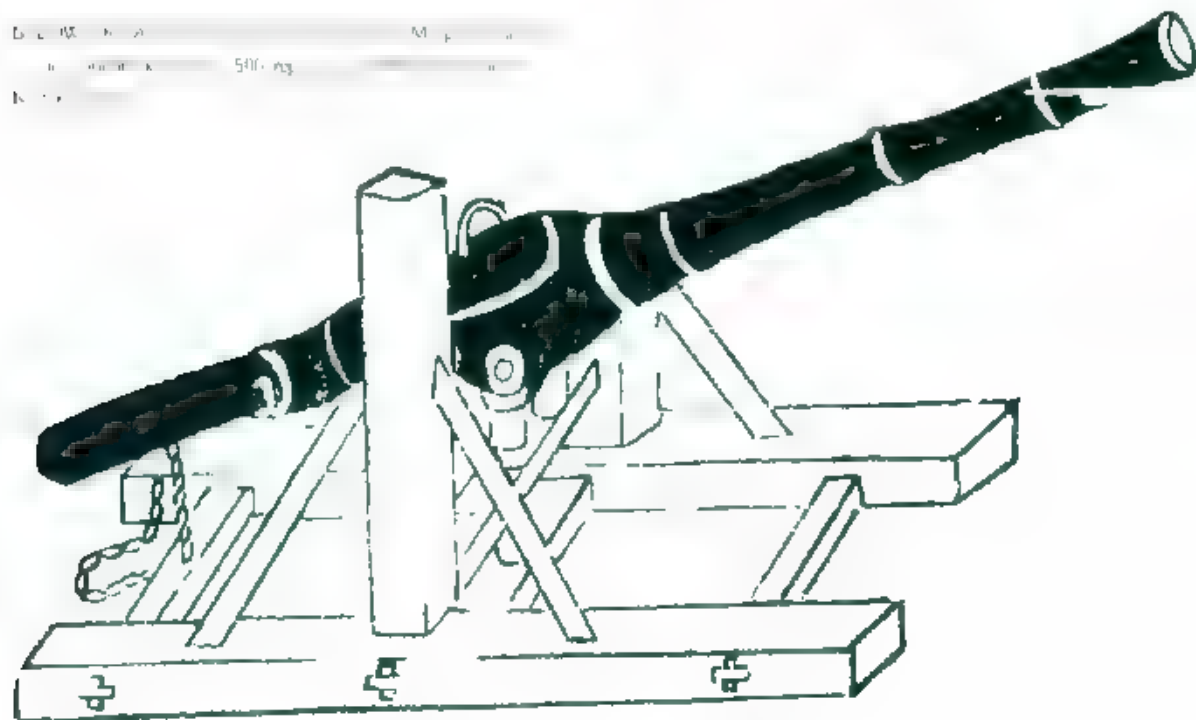
Use a barrel 3 feet long cast from high-grade bronze, and designed to take only a single arrow. Put 0.3 ounces of 'blinding gunpowder' as charge into the barrel before firing, whereupon the arrow is sent flying like a fiery serpent, with a range of between 200 and 300 paces. It can pierce the heart or the belly when it strikes a man or a horse, and can even transfix several persons at once.

Fire-lances with several barrels were frequently used and were built so that when one fire-tube had exhausted

itself, a fuse ignited the next, and so on. One triple-barrelled fire-lance was called 'the triple resistor', another was called 'the three-eyed lance of the beginning of the dynasty'. Several old woodcuts of these weapons survive so that we know what they looked like and how they were constructed. One curious weapon was the 'thunder-fire whip' – a fire-lance in the shape of a sword, 3 feet 2 inches long and tapering into a muzzle. It discharged three corn-sized lead balls. An even stranger one was the 'vast-as-heaven enemy exterminating Yn-Yang shov' which had a broad crescent-shaped blade at its end and emitted poison as well as flames and lead pellets.

Certainly one of the most ingenious and useful fire-lances was the 'mattock gun'. It was fixed at right angles to a pole and could be hoisted to the top of the battlements where a hidden operator crouched behind and fired at besiegers coming over the wall. Besides flames, it shot six or seven pellets at a time from its mattock barrel.

There were also huge batteries of fire-lances which could be fired simultaneously from mobile racks. One such was called 'the ingenious mobile ever-victorious poison-fire-rack' and it seems to have originated in the fourteenth century. A great frame with several wheels would hold many layers of sixteen fire-lances one after the other. It took ten men just to light all the fuses at once. A quaint description of its use in defending a besieged city relates:



When the enemy approaches the gate, all the weapons are fired at a single moment, giving a noise like a great peal of thunder, so that his men and horses are all blown to pieces. You can then open the city-gate and, relaxing, talk and laugh as if nothing had happened, this is the very best device for the guarding of cities.

Since these fire-racks were highly mobile, they were probably the earliest form of proto-tank, though of course no one was inside them. The blast from a fire-rack containing perhaps 200 fire-lances fired at once is hardly to be imagined, and the men operating them must have gone deaf very soon. The nearest thing to the fire rack in modern times is perhaps the Russian 'Stalin-Organ', though this is used to launch rockets.

Yet another variation on the fire-lance was the 'one-eyed magicaly-efficient gun', which was a swivel gun. It had a metal barrel and wooden handle, and was inserted into one of three rings on a pole thrust into the ground on a spike to keep it steady. The swivel or forked rests later used in Europe with early muskets may have originated from this weapon.

The earliest evidence we have of fire-lances in Europe is from a Latin manuscript dated 1396, 450 years later than the Chinese version. It depicts them vividly, and contains a very dramatic picture of a mounted horseman charging ahead with a long, blazing fire-lance in his right hand. The Chinese proto-cannons – the 'eruptors' – appeared in the thirteenth century. *The Fire-Drake Artillery Manual* of 1412 describes one:

The shells are made of cast iron, as large as a bowl and shaped like a ball. Inside they contain half a pound of 'magic' gunpowder. They are sent flying towards the enemy camp from an eruptor, and when they get there a sound like a thunder-clap is heard, and flashes of light appear. If ten of these shells are fired successively into an enemy camp, the whole place will be set ablaze and his men will be thrown into confusion. You can use any kind of gunpowder in the shells – blinding powder, flying powder, violent powder, poison powder, bruising and burning powder, and smoke-screen powder, according to the circumstances.

Chang Hsien wrote a poem called 'The Iron Cannon Affair' in the year 1341 which describes an eruptor in operation:

The black dragon lobbed over an  
egg-shaped thing  
Fully the size of a peck measure it was,  
And it burst, and a dragon flew out  
with peals of thunder rolling  
In the air it was like a blazing and  
flashing fire.  
The first bang was like the dividing  
of chaos in two,  
As if mountains and rivers were  
all turned upside down. ..

Just as the multi-barrelled fire-lance and the eruptors were ingenious innovations, so was the 'multiple bullets magazine eruptor'. Undoubtedly the idea of a magazine of projectiles had occurred to someone because of the widespread use of magazines on repeating crossbows. The eruptor was 4 feet 5 inches in length and made of cast bronze. A magazine a foot long, containing about a hundred lead balls, fed into it from the side as it spewed out flame. When the



ABOVE 184: A fourteenth-century bomb in the process of exploding. This one contains poisons and iron splinters (it will extinguish spiked objects intended to enter the ground and wound the feet of men and horses). Reproduced from *The Fire-Drake Artillery Manual of Ching-mei-tai-jen* 1412.

eruptor was at rest the barrel was rotated, enabling the magazine to fall out and be loaded. Then, as firing began the barrel would be rotated back again and the pellets would start falling down into the flames and be shot forth – the world's first repeating-cannon. It must be stressed, however, that only the projectiles could be termed 'repeating' not the charge.

A naval version of the eruptor fired 'chain-shot'. This consisted of two cannonballs joined together by a chain or an iron bar. When fired from an eruptor, these rotated at great speed through the air smashing the spars and rigging of an enemy ship and clearing its upper deck of men.

The gunpowder in these eruptors and fire-lances usually had 60 per cent of saltpetre in its composition as was the case with rockets (see page 264). For the true gun higher percentages of saltpetre were necessary – between 71 and 85 per cent. But it is worth pointing out that with this amount of saltpetre rockets will not function properly because the mixture becomes too explosive. Thus a wide variety of gunpowder mixtures was used for fire-lances, eruptors, rockets and true guns – each mixture tailored specially for each weapon. And, of course, there were different types of poisonous gunpowder for use when the wind was right, and coloured gunpowders for signal flares.

The true gun was eventually developed in China at some time during the thirteenth century. A bronze hand gun from 1288 has been excavated at Heilunchiang Province in Manchuria. It is more than 1 foot long and weighs 8 pounds. The gunpowder chamber has a small touch-hole for ignition, the bore is even. The explosion chamber is strengthened by a bulbous enlargement of the barrel at that point, which was a common feature of early guns to prevent them from splitting under the force of their own internal explosions.

For such a perfect little gun to exist in 1288 – how long had guns existed prior to that date? The fact is, new inventions did not at once attract new words, at first a gun was hardly different from a fire-lance, so the same word was used for both weapons. It is safe to presume that guns

evolved a pound 250 at the latest around 1280.

When did guns reach Europe? The earliest evidence is a picture of a bombard (a snail-bulbous cannon with a constant bore) which fired arrows, depicted in a 1327 manuscript by Walter de Milemete's *On the Majesty, Wisdom and Prudence of Kings*, in the Bodleian Library at Oxford. Whereas it took 450 years for the fire-lance to reach Europe from China, the true gun did so in a tenth of that time.

How were these things transmitted? Needham believes it is quite likely that gunpowder in the form of fire-crackers reached Roger Bacon in England in 1265 through his friend the Franciscan William Ruysbroeck, who returned from China in 1256. Alternatively, Chinese evidence exists of a mission to the emperor by Scandinavian trader-envoys who reached China in 1261, several years before Marco Polo, apparently having travelled overland through what was then the independent kingdom of Novgorod.

After 1260, many foreigners were welcomed and employed by the Mongol emperors in China. It was their policy to treat the native Chinese as third-class citizens, hardly even regarding them as human. The Mongols did not trust the Chinese to run things, and tried to create a civil service of Mongols. Europeans and Arabs. With these constant foreign visitations, the transmission of guns to Europe was inevitable. Indeed, the writer Miu Yu-Sun quotes an obscure scholar, Yu Wei, as saying that in the second half of the thirteenth century a Mongol, Ch' Wu Wen, went to Europe and took with him a complete knowledge of gunpowder technology and gunnery.

The similarities between the earliest European eruptors and cannons and the slightly earlier Chinese ones are so striking that it seems likely that actual guns were transported to



LEFT 185. A primitive thirteenth-century breech-loading Chinese mortar gun of cast iron, with a wooden stock. The total length of this weapon is 8 feet. This type of gun was used for the defence of fortifications and was not carried in the field. It was probably seized by British forces during the nineteenth-century conflicts in China and carried home as a specimen (The Royal Armouries, Tower of London).



LEFT: The A on page 258 shows the barrel of a cannon. The barrel is 8 inches in diameter, 6 inches in length, and the cannon is 14 inches in diameter.

Europe for direct copying. For instance, the earliest piece of field artillery we know of in China was on four wheels and called the 'thousand-bal' thunder cannon. This cannon had a bulbous body round the explosion chamber, and was ringed by bands of iron. A surviving woodcut from an old Chinese book shows that it was virtually identical to an early European field artillery piece portrayed in a German manuscript of about 1450. The German cannon was probably a direct copy, or it might even have been an obsolete Chinese model sold by some corrupt official to a Dutch trader.

Chinese fire-lances and eruptors did not fit the description of true guns as having a constant bore and a smoothly fitting projectile of exactly the right size. But between 1250 and 1280 the Chinese finally did achieve the manufacture of true guns, and by the 1320s these had reached Europe.

The evolution of guns and cannons proceeded apace in China, where perfectly cast iron cannons were being produced before Europe had even learned how to make cast iron (see page 44). The bulbous reinforcing of the barrel was superseded by even barrels along the whole length, while iron bands encircling the barrels provided reinforcement. These grew and flattened out as development proceeded so that eventually the barrels were more than half covered by large flattened bands. Cannons commonly bore inscriptions, like crossbow triggers on handstems, giving their precise dates of manufacture. There are literally hundreds of

medieval Chinese cannons still in existence today.

Projectiles also survive: rounded stones or carefully cast bronze or iron balls, and exploding cast-iron 'thundercrash' bombs (described at length on page 258). Bags of shot which smoothly fitted the bore could also be fired, as in the shotguns of today. While some of the cannons were laid flat, others were set at an angle and lobbed projectiles over, acting as mortars. As metallurgy developed, cannons became larger, longer and heavier. We read in *The Four-Drum Artillery Manual* (1412) of a cannon which weighed 129 pounds. It was called the long-range awe-inspiring cannon.

Each weighs 72 kilograms (159 pounds) and measures 2 feet 8 inches long. The touch-hole is 5 inches from the base and 32 inches from where the belly begins. The diameter of the bore at the muzzle is more than 22 inches. Above the touch-hole there is a movable lid to protect the priming powder from rain. This cannon does not give a great bang or much recoil. With 8 ounces of gunpowder one uses one large lead ball weighing 12 kilograms (26 pounds), or a hundred small lead bullets in a bag, each weighing 0.6 ounces. Firing is done very conveniently by hand.

However, cannons grew in size from this until one weighing 1389 pounds, called the great invincible





3E.L.O.W. 188) Sixteenth century Chinese mortars being fired. These vase-shaped mortars have a uniform bore and despite the hinge outside. These were called the 'flying, smashing and burning

bin-jiao bombs. They fired cast-iron bombshells which, when they exploded, also showered the ground around with caltrops, nasty little metal objects covered in sharp, poison-tipped points, which would be ridden

fired, and then the barrel was quickly rotated so that the second one fired. We are told

Immediately after firing the first gun the second is rotated into position and fired, each one being muzzle-loaded with a large stone projectile. If the gun is aimed at the hull of an enemy ship below the waterline, the cannon-balls shoot along the surface and smash its side into splinters. It is a very handy weapon.

A further step was the development of the 'cartwheel gun'. It had thirty-six barrels radiating from its centre like the spokes of a wheel. These guns were small enough that a single mule could carry two, one on each side of its pack. However, as some of the barrels pointed at the gunner, there must have been some nasty accidents, so these 36-repeaters were never widely adopted.

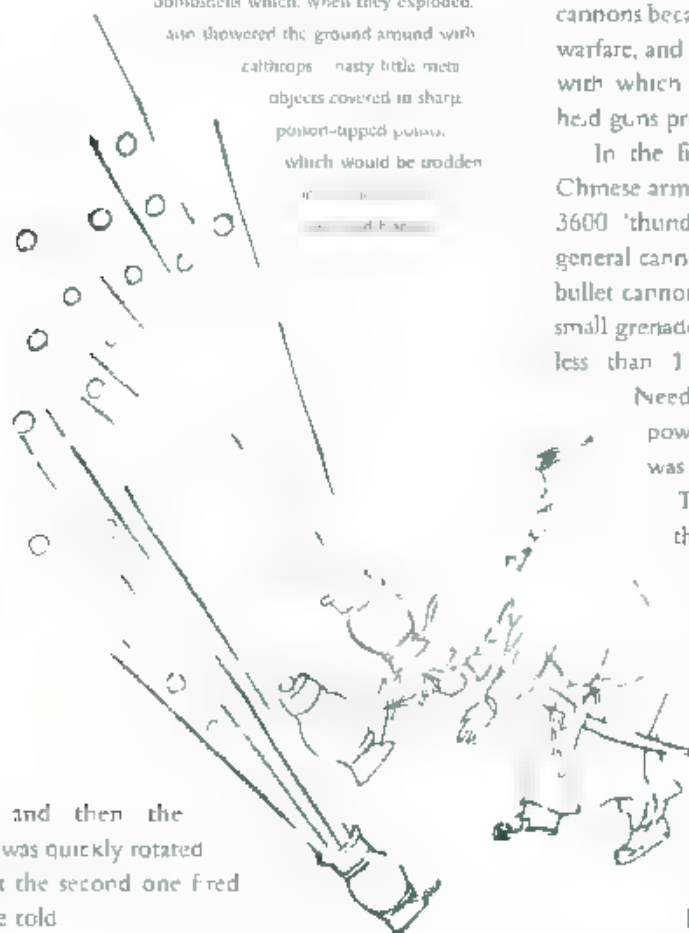
Batteries of true guns were used, just as batteries of fire-lances had been. For instance, there was a 'nine ox-jar battery' with nine cannons resting together on a frame and fired by one fuse. Guns were also wheeled around on wheelbarrows. As the centuries wore on, cannons became more and more important in Chinese warfare, and huge artillery duels took place of a kind with which Europeans are well familiar. And hand-head guns proliferated even more.

In the fifteenth century a single battalion of a Chinese army was provided with 40 cannon batteries, 3600 'thunder bolt shells', 160 'wine-cup muzzle general cannons', 200 large and 328 small continuous bullet cannons' firing grape-shot, 624 hand guns, 300 small grenades, some 6.97 tons of gunpowder and no less than 1,051,600 bullets, each of 0.8 ounces.

Needham remarks: 'This was quite some firepower, and the total weight of the weaponry was reckoned to be 29.4 tons.'

The vast quantities of weapons used and the enormous numbers of deaths which resulted make European war-death statistics before the nineteenth century seem puny. It is important to realize that Chinese armies commonly numbered hundreds of thousands at a time. By contrast, the English Civil War of the seventeenth century was fought by only a few thousand people and if casualties for a single battle mounted into the hundreds it was considered horrific.

Indeed the mass-production of armaments in medieval China rivaled the output of twentieth-century Detroit with its assembly lines of automobiles; division of labour and assembly-line techniques of producing crossbows, guns, gunpowder, porcelain, and all manner of commodities, both helpful and harmful, were traditional for centuries. The 'military industrial complex' entirely state-run, with stringent security and highly classified new weapons projects, is a two-thousand-year-old phenomenon in China. The Chinese were as expert at killing people as they were at inventing beneficial things; they were arms manufacturers on a scale undreamed of until modern times in the West. The Chinese inventive genius certainly did not hold back in pacifist timidity from the design and manufacture of weapons. No nation in the world could match the Chinese expertise in warfare for two millennia.



# CHINESE DYNASTIES

	<i>Hsia Kingdom (legendary?)</i>	c. 2000–c. 1520 BC
	<i>Shang (Yin) Kingdom</i>	c. 1520–c. 1030 BC
	<i>Chou Dynasty</i>	
	<i>Early Chou period</i>	c. 1030–722 BC
	<i>Ch'un Ch'iu period</i>	722–480 BC
	<i>Warring States period</i>	221–207 BC
First Unification	<i>Ch'in Dynasty</i>	
	<i>Han Dynasty</i>	
	<i>Ch'ien Han (Earlier or Western)</i>	207 BC–9 AD
	<i>Hsin interregnum</i>	9–23
	<i>Hou Han (Later or Eastern)</i>	25–220
	<i>San Kuo (Three Kingdoms period)</i>	221–265
First Partition	<i>Shu (Han)</i>	221–264
	<i>Wei</i>	220–265
	<i>Wu</i>	222–280
Second Unification	<i>Chin Dynasty</i>	
	<i>Western</i>	265–317
	<i>Eastern</i>	317–420
	<i>(Liu) Sung Dynasty</i>	420–479
Second Partition	<i>Northern and Southern Dynasties</i>	
	<i>Ch'i</i>	479–502
	<i>Liang</i>	502–557
	<i>Ch'en</i>	557–589
	<i>Northern Wei Dynasty</i>	386–535
	<i>Western Wei Dynasty</i>	535–556
	<i>Eastern Wei Dynasty</i>	534–550
	<i>Northern Ch'i Dynasty</i>	550–577
	<i>Northern Chou Dynasty</i>	557–581
Third Unification	<i>Sui Dynasty</i>	581–618
	<i>T'ang Dynasty</i>	618–906
Third Partition	<i>Wu Tai (Five Dynasty Period)</i>	
	<i>Later T'ang (Turkic)</i>	
	<i>Later Chin (Turkic), Later Han (Turkic), and Later Chou</i>	907–960
	<i>Liao (Ch'itan Tartar) Dynasty</i>	907–1124
	<i>West Liao Dynasty</i>	1124–1211
	<i>Hsi Hsia (Tangut Tibetan) State</i>	986–1227
Fourth Unification	<i>Northern Sung Dynasty</i>	960–1126
	<i>Southern Sung Dynasty</i>	1127–1279
	<i>Chin (Jurchen Tartar) Dynasty</i>	1115–1234
	<i>Yuan (Mongol) Dynasty</i>	1260–1368
	<i>Ming Dynasty</i>	1368–1644
	<i>Ch'ing (Manchu) Dynasty</i>	1644–1911
	<i>Republic</i>	1912–
	<i>People's Republic</i>	1949–







# TIME LAGS BETWEEN CHINESE INVENTIONS AND DISCOVERIES AND THEIR

AND  
CARTOGRAPHY AGRICULTURE  
ENGINEERING  
DOMESTIC AND INDUSTRIAL TECHNOLOGY  
MEDICINE AND HEALTH

fewer authors crops and intensive breeding

6th century BC

The iron plough

3rd century BC

Efficient horse harnesses trace

4th century BC

quar

3rd century BC

The rotary winnowing fan

2nd century BC

The multi-tube ('modern') seed drill

2nd century BC

Recognition of sunspots as solar phenomena

Quantitative cartography

Discovery of the solar wind

The Mercator map-projection

Mounted) Equatorial astronomical instrument

patting bowls and standing wave

5th century BC

Cast iron

6th century BC

The double-acting piston bellows \* air # liquid

4th century BC

The crank handle

2nd century BC

the garden suspension, or gimbar

2nd century BC

Manufacture of steel from cast iron

2nd century BC

Deep drilling for natural gas

1st century BC

The belt drive (or driving belt)

Water power

The chain pump

The suspension bridge

The first cybernetic machine

Essentials of the steam engine

Magic mirror

The Siemens' steel process

The segmental arch bridge

The chain drive

Underwater salvage operations

Lacquer the first plastic

1st century BC

Strong beer (sake)

1st century BC

Petroleum and natural gas as fuel

Apoc

2nd century BC

The wheelbarrow

1st century BC

Sliding campers

1st century BC

The magic lantern

The fishing reel

The stirrup

Porcelain

Biological pest control

The umbrella

Matches

Chess

Brandy and whisky

The mechanical clock

Printing block printing

movable type

Playing-cards

Paper money

Permanent lamps

The spinning-wheel

circulation of the blood

6th century BC

Circadian rhythms in the human body

2nd century BC

The science of endocrinology

2nd century BC

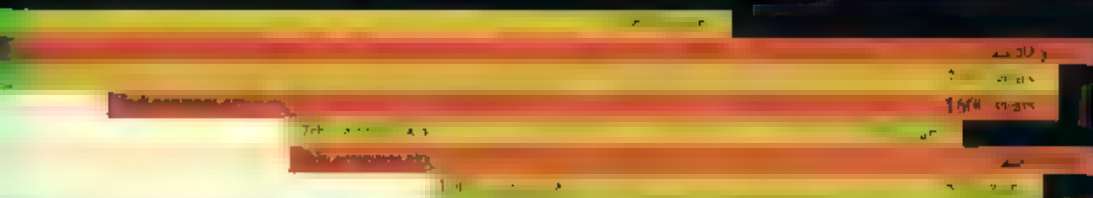
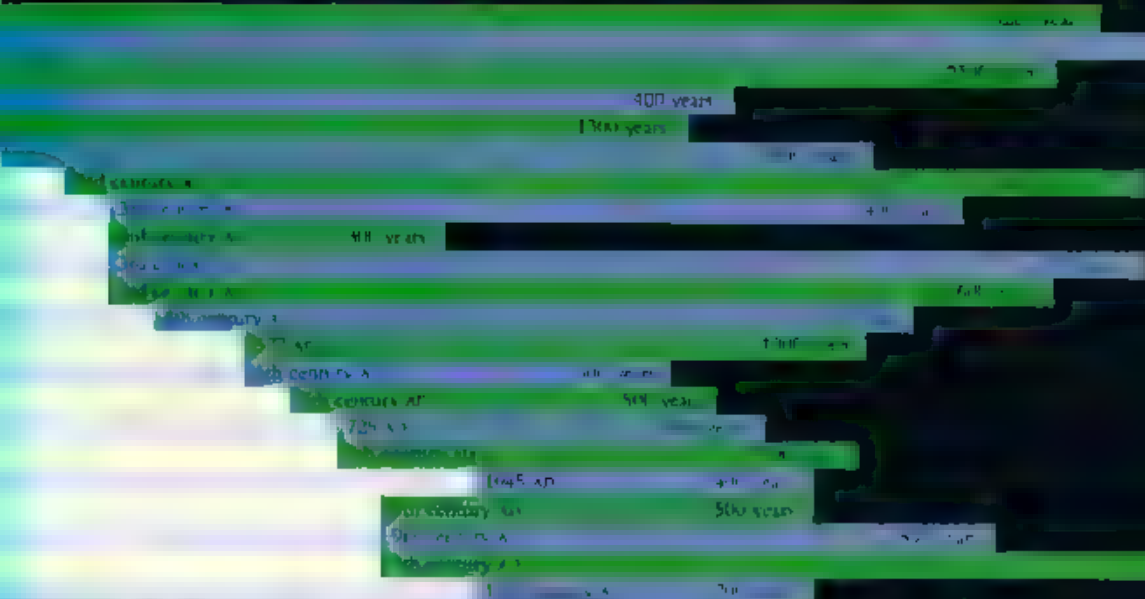
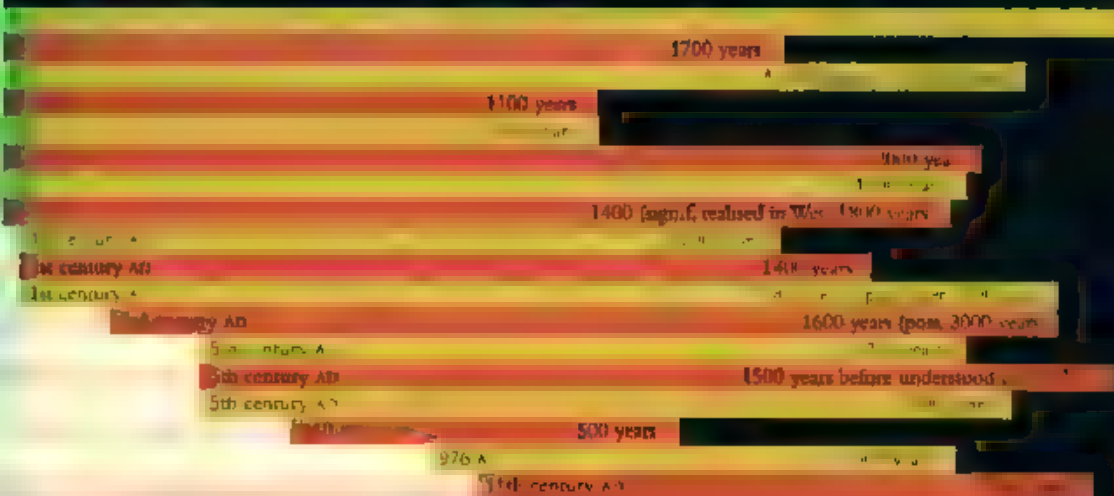
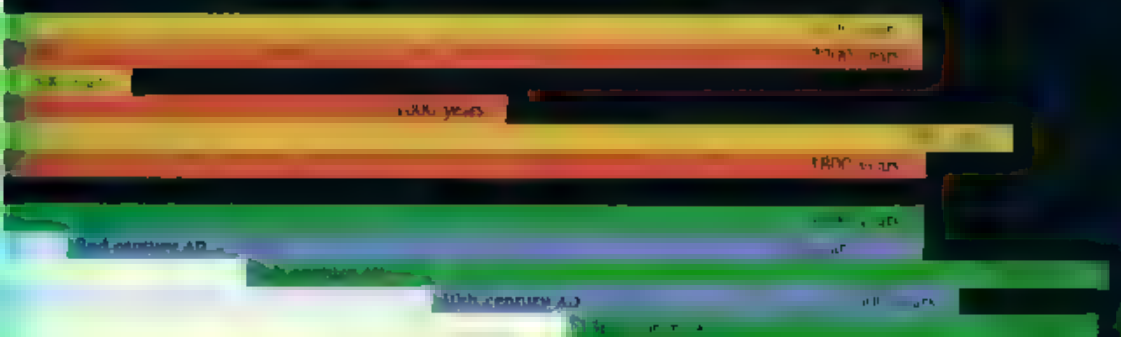
Deficiency diseases

Diabetes discovered by urine analysis

Use of thyroid hormone

Use of thyroid hormone

## ADOPTION OR RECOGNITION IN THE WEST



# TIME LAGS BETWEEN CHINESE INVENTIONS AND DISCOVERIES AND THEIR

MATHEMATICS  
MAGNETISM  
SCIENCE  
AERONAUTICS  
EXPLORATION  
SOUND AND MUSIC  
WARFARE

- The first use of
- A place for zero
- Negative numbers
- Extraction of higher roots and solutions of higher numerical equations
- Decimal fractions
- Using algebra in geometry
- A refined value of  $\pi$
- Pascal's triangle of binomial coefficients

14th century BC

10th century AD

12th century AD

13th century AD

- The first compasses
- Dial and pointer devices
- Magnetic declination of the Earth's magnetic field
- Magnetic remanence and induction

14th century BC

- The first use of printing
- The First Law of Motion
- The suspension of ice or snowflakes
- The seismograph
- Spontaneous combustion
- Modern geology
- Phosphorescent paint

15th century AD

16th century AD

17th century AD

- The kite
- Manned flight with kites
- The relief maps
- The first contour transport canal
- The parachute
- Miniature hot-air balloons
- The rudder
- Mast and sailing: Batten sails, Sagged Masts
- Multiple masts - Fore and aft rig
- Watertight compartments in ships
- Leeboards
- The helicopter rotor and the propeller
- The paddle-wheel boat
- Land sailing
- The water-powered clock

5th/4th century BC

1st century BC

1st century AD

1st century BC

2nd century BC

- The water-powered clock
- Tuned drums
- Hermeneutically-learned research laboratories
- The first understanding of musical timbre
- The first understanding of musical

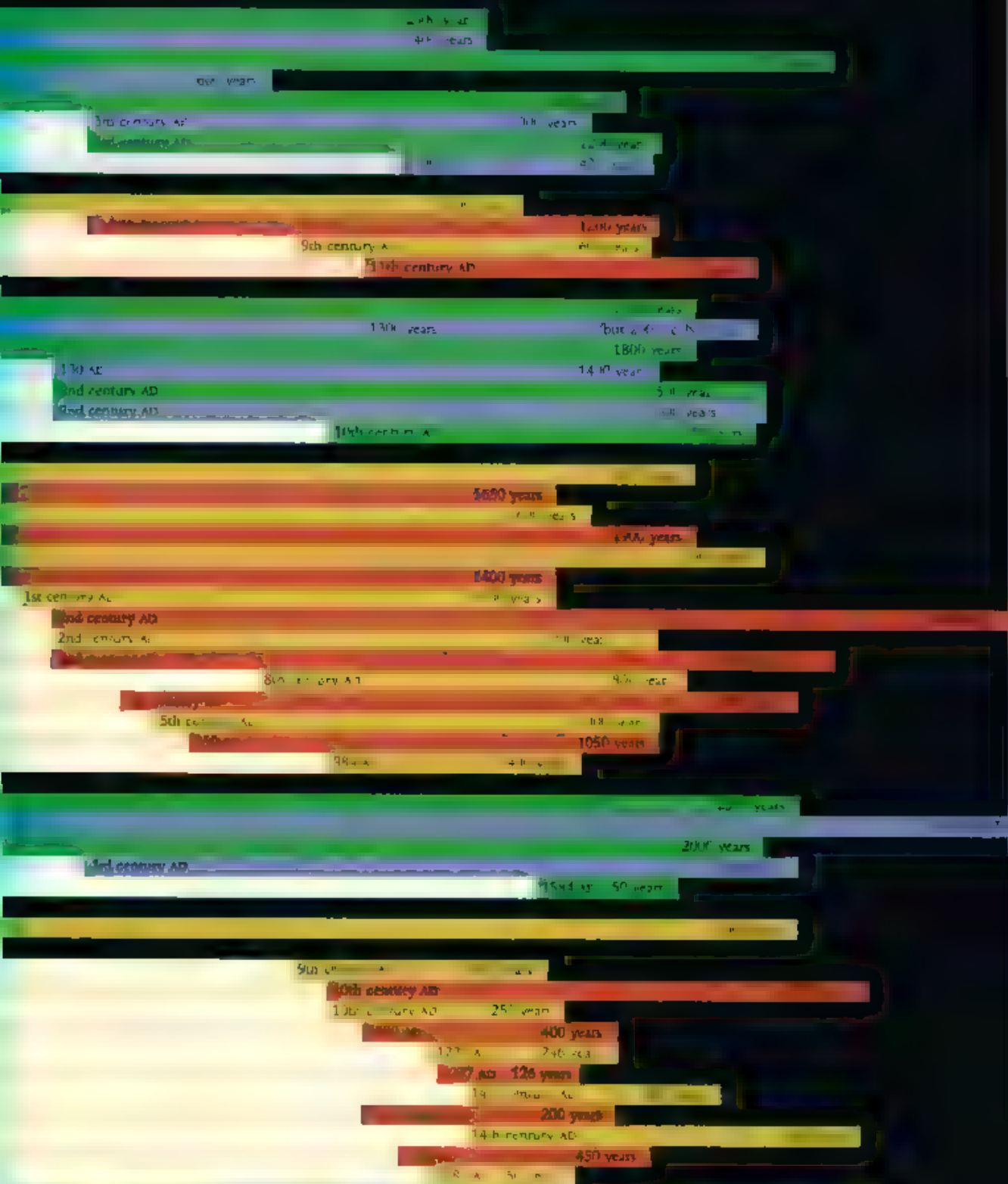
14th century AD

12th century AD

- The naval warfare: poison gas, smoke bombs and tear gas
- The crossbow
- Gunpowder
- The flame-thrower
- Flares and fireworks
- Soft bombs and grenades
- Meta-cased bombs
- Land mines
- Sea mines
- The rocket
- Multi-staged rockets
- Guns, cannons and mortars
- Artillery
- Tear gas

4th century

# ADOPTION OR RECOGNITION IN THE WEST



# INDEX

The use of **bold** indicates main subject  
 terms and subject main entries

## A

acupuncture 136, 138, 4  
 agricultural revolution, European 13, 6, 18, 21, 22, 23  
**agricultural tools and methods** 4, 27, 216, 218, 219  
 alchemy 144, 250, 251, 252  
 algebra 53, 136, 158  
 angle of magnetic declination 168, 4  
 Aristotle 59  
 Aristotle 79  
 armillary sphere 6, 4  
 1st BC 14, 11, 11  
 2nd BC 42, 172, 88  
 3rd BC 20, 28, 44, 46, 89, 151, 162, 75, 88, 91, 2, 1, 1  
 1st BC 20, 95, 197  
 2nd BC 24, 25, 49, 50, 53, 22, 136, 39, 4, 55, 175, 197, 211, 2  
 3rd BC 62, 14, 4, 4  
 4th AD 31, 38, 177, 181, 182, 203, 21  
 5th AD 116, 21  
 6th AD 130, 131, 68, 169, 251  
 7th AD 36, 81, 149, 86, 248, 251, 2  
 1st AD 82, 123, 34, 161, 2  
 2nd AD 262  
 1st AD 3, 11  
 6th AD 234  
**astronomy** 78, 30, 34-5, 37-41, 278, 9

## B

Bach, Johann Sebastian 234, 237  
 Bacon, Francis 10, 15  
 bamboo 56, 57, 58, 64, 68, 69, 89, 90, 9, 67, 38, 206, 210, 2  
 banking 132, 133, 152, 3, 35  
 beer steins 206, 87, 9  
 bellows, double-acting piston 46-9, 57, 73, 77, 254, 256  
 bells, large tinned 220-3, 224  
 belt drives 59-62, 135  
 bicycles 145  
 bicycles 80, 82  
 binomial coefficients 61  
 biological clock see circadian rhythms in the human body  
 biological pest control 107-8  
 bioluminescence 41  
 blood circulation 136-9  
 borates 257-60  
 and mineral prospecting 172-5  
 bowls, sporting 42, 4  
 Boyle, Sir Robert 74, 7  
 Braine Tycho 37, 4  
 brandy and whiskey 113-16  
 Bray, Francesco 12  
 bridges 9  
 pontoon 82, 3  
 segmental arch 77-9, 81  
 suspension 64-70  
 buildings, cast iron 44, 4  
 buoyancy techniques 83

## C

calendars 21  
 canals, sliding 97-8  
 contour canals 197-9  
 pound-locks 99, 218, 19  
 cannons 268, 269, 27, 272-3  
 Canton John 187  
 Cardan, Jerome 50, 55, 56  
 Cardan suspension in gimbals  
**cartography** 30, 4, 38, 195-7, 278-9  
 cast iron 44-6  
 and steel manufacture 53-6  
 See also iron  
 history of Chinese discoveries and invention  
 1st BC 152  
 2nd BC 84  
 1st BC 8  
 6th BC 14, 11, 11  
 7th BC 42, 172, 88  
 8th BC 20, 28, 44, 46, 89, 151, 162, 75, 88, 91, 2, 1, 1  
 1st BC 20, 95, 197  
 2nd BC 24, 25, 49, 50, 53, 22, 136, 39, 4, 55, 175, 197, 211, 2  
 3rd BC 62, 14, 4, 4  
 4th AD 31, 38, 177, 181, 182, 203, 21  
 5th AD 116, 21  
 6th AD 130, 131, 68, 169, 251  
 7th AD 36, 81, 149, 86, 248, 251, 2  
 1st AD 82, 123, 34, 161, 2  
 2nd AD 262  
 1st AD 3, 11  
 6th AD 234  
 ceramics see porcelain  
 chain-driven 62, 80-2, 7  
 chain pumps 62-4, 8, 215  
 Chalonier, Sir Thomas 174  
 Chang He 30, 38, 41, 70, 177, 78, 79  
 Chang Su Hsun 81, 121, 11  
 chemical warfare 253, 254  
 poison gas 240-1, 243, 251  
 smoke bombs 242, 244  
 cast iron 242, 3  
**chess** 111, 53  
 11, 15, 136, 138, 70, 93, 228, 229, 230, 231  
 Chu San Pen 3, 11  
 cinematography 98, 18  
 circadian rhythms in the human body 139-41  
 circulation of the blood 136-9  
 clocks, mechanical 11, 81, 7, 116, 23  
 locking 92, 3  
 1st 45  
 clockwork Christopher 169, 214, 215  
 1st 4, 7



# J

Japan 31-32

# K

Kang Shou-Ch'ang 38

Kepler Johannes 41 175

kites 188-91 212

spanned flight using 191-5

K'o Hsing 92 195 212 251 252

K'uei 96

K'o Ssu-ch'ung 37 40 41

# L

laboratories, hermetically sealed 228-31

lacquer 84-7

Lagrange, Comte 156

lamps

bioluminescent 186

gas and oil 91 92

gimbal mountings for 50 51 52

permanent 134

land sailing 216-18

lantern globe 202 3

Leo Tzu 46

latitude and longitude

lines 38 100 77

Li Ch'un 77 79

Li Ch'ung-shan 191-2 212 213 214

Li, canal 199 218-19

Li Cwei-Djen 9 2

Li Hsiang-shan

# M

Mach

magic lanterns 58-100

magazines 74 6

magazines 36

magnetism 62 71 284-1

map of China 276-7

mapping in cartography

Mao Tse-tung 181

Mao Tse-tung 181

Mao Tse-tung 181

medicinal drugs 42

porcelain 134

porcelain 134

porcelain 134

porcelain 134

porcelain 134

mathematics 152-61 281

mathematics 152-61 281

mathematics 152-61 281

mechanical clocks 81 2 116-23

medicine and health 136 51 278-9

Mercator map-projection 36

meridians 38 40

military activities see warfare

military activities 38 40

military activities 38 40

military activities 38 40

military activities 38 40

money, paper 126 131 3

Montgolfier, Joseph and Etienne 21

monks 274

motion, first law of 175

mouldboards, plough 18 20

music see sound and music

# N

natural gas

as fuel 89-92

deep drilling for 45 56-9 89

navigation see canals and ships

Needham, Dr Joseph 7 9 3 13

negative numbers 155

Newton, Isaac 11 175

# O

oiled cloth

oiled cloth

oiled cloth

# P

paint 213 16

paint phosphorescent 186-7

paint 92 5 6

paint 13 3

paint 13 3

parachutes 199-201

Pascal's triangle 160-1

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

patent control biological 107-8

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